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99th Congress, 2d Session - - - - - - - - - - House Document 99-250

MONONGAHELA RIVER NAVIGATION SYSTEM, PENNSYLVANIA AND WEST VIRGINIA, LOCKS AND DAMS 7 AND 8

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

TRANSMITTING

A REPORT FROM THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY, DATED SEPTEMBER 24, 1984, ON MONONGAHELA RIVER NAVIGATION SYSTEM, PENNSYLVANIA AND WEST VIRGINIA, LOCKS AND DAMS 7 AND 8, THE REPORT IS IN PARTIAL RESPONSE TO A RESOLUTION ADOPTED SEPTEMBER 23, 1976

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LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310-0103

15 JUL 1986

Honorable Thomas P. O'Neill, Jr.
Speaker
House of Representatives
Washington, D. C. 20515-2108

Dear Mr. Speaker:

I am transmitting herewith a report dated September 24, 1984, from the Chief of Engineers, Department of the Army, on Monongahela River Navigation System, Pennsylvania and West Virginia, Lock and Dams 7 and 8, together with other pertinent reports. These reports are in partial response to a resolution adopted September 23, 1976, by the Committee on Public Works and Transportation, House of Representatives.

The views of the Governor of Pennsylvania, the Department of Environmental Resources of the Commonwealth of Pennsylvania, the State of West Virginia, the Departments of the Interior, Agriculture, Transportation, and Environmental Protection Agency are set forth in the enclosed communications, together with pertinent replies.

I concur with the plan of improvements as recommended by the Chief of Engineers, subject to enactment of generic cost sharing legislation.

The Office of Management and Budget advises that there is no objection to the submission of this report to the Congress and that the Administration supports authorization of the project for construction in accordance with the above recommendations, contingent upon passage of inland user-fee legislation consistent with Administration policy. A copy of its letter is enclosed.

Sincerely,

Robert K. Dawson
Assistant Secretary of the Army
(Civil Works)

Enclosures

COMMENTS OF THE OFFICE OF MANAGEMENT AND BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

May 5, 1986

Honorable Robert K. Dawson
Assistant Secretary of the Army
for Civil Works
Room 2E570 - Pentagon
Washington, D.C. 20310

Dear Mr. Dawson:

We have completed our review of the report and your recommendations on Locks and Dams 7 and 8, Monongahela River, Pennsylvania, as required under Executive Order 12322.

The Office of Management and Budget does not object to your submitting this report to Congress. The Administration supports authorization of this project for construction in accordance with your recommendations, contingent upon passage of inland user-fee legislation consistent with Administration policy.

Sincerely,

Randall E. Davis

Randall E. Davis
Associate Director for
Natural Resources,
Energy and Science

COMMENTS OF THE GOVERNOR OF PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA
OFFICE OF THE GOVERNOR
HARRISBURG

August 14, 1984

tenant General J. K. Bratton
f of Engineers
: DAEN-CWP
rtment of the Army
ington, D.C. 20314

General Bratton:

The Commonwealth of Pennsylvania vigorously supports the osed report of the Chief of Engineers, U.S. Army Corps of neers, which will be submitted to Congress recommending truction of new, modern locks and dams at Point Marion Gray's Landing in Pennsylvania replacing the aging, ficient 60 year old Locks and Dams 7 and 8 on the Monnela River Navigational System.

The Federal government, Pennsylvania and the states ering the Ohio River System are all embarking on coal lopment programs which will significantly increase its as a major source of energy. We are also experimenting he development of possible synthetic energy sources using . A modern and efficient inland waterways system is ntial for these future ventures. These proposed new and cient locks and dams will be a giant step forward in pro- ng an inexpensive and energy-efficient transportation mode will permit this energy source and other commodities to n the ultimate consumer.

The Pittsburgh Industrial Area, now the largest inland r port in the Nation, and other cities in the Southwestern sylvania industrial complex are dependent on reliable, safe energy-efficient inland waterways transportation for rous other products and must be assured that this mode of sportation will be available in the future in order to ce re-investment and industrial growth in the area.

The construction of the new modern navigational structures at Point Marion and Gray's Landing on the upper Monongahela River will serve to insure the continued growth of this industrial area. In addition, these newly proposed navigational structures will serve to improve flood control, fire protection, water resources for treatment plants, fish and wildlife habitate and increase and improve recreational facilities for the communities in this region.

The Commonwealth of Pennsylvania recognizes its commitment to the improvement of the industrial potential of the Southwestern Pennsylvania region. We have allocated $40,000,000 from our Water Facilities Restoration program in long term, low interest loans for the rehabilitation and revitalization of Pennsylvania's river port and terminal operations.

We will continue to support legislation calling for the authorization for the construction of new, modern, and efficient navigational structures at Gray's Landing and Point Marion on the upper Monongahela River Navigational System.

Sincerely,

Dick Thornburgh
Governor

x

COMMENTS OF THE COMMONWEALTH OF PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
P.O. Box 2063
Harrisburg, PA 17120

August 15, 1984

Paul F. Kavanaugh
Colonel, Corps of Engineers
Department of the Army
Office of the Chief of Engineers
Washington, D.C. 20314

Dear Colonel Kavanaugh:

We have reviewed the Final Environmental Impact Statement - Locks and Dams 7 and 8 Feasibility Study for the Monongahela River Navigation System.

The Pennsylvania Department of Environmental Resources strongly supports the need for improvements to the Monongahela River Navigation System through the project recommended in this feasibility study for Locks and Dams 7 and 8. The improvements are key elements of the waterway transportation network in Western Pennsylvania and other states and are vital to economic development in the region served by the navigation system. We believe the selected plan maximizes net benefits and is the least detrimental to the environment of all the replacement plans considered.

Although Section VII of the Feasibility Study addresses the addition of hydropower development to the proposed modified navigation system, it does not address the possibility of hydropower development of the existing projects by non-Federal entities prior to completion of the recommended project plan. The Borough of Point Marion has applied for a Federal Energy Regulatory Commission License to develop such a project at the existing Monongahela River Lock and Dam #8. Since the proposed new lock at the Point Marion site may require flows which are also being considered for use by the power project, the question arises whether a FERC license project could take precedence over the proposed modification.

We can foresee a possible conflict with the Federal Energy Regulatory Commission should the power project be licensed under existing conditions. The Corps of Engineers, the Borough of Point Marion and the FERC should be considering the possible implications of permitting hydropower development at these sites prior to the proposed modifications. The Corps may be able to exercise some control through their lease agreement negotiations with Point Marion Borough if a license is issued.

There are several sources of public water supplies in Pennsylvania that might suffer adverse affects due to the project. Consideration must be given to these water supplies where elevations are to be changed or where construction might cause siltation and degradation of the raw water supply.

Thank you for the opportunity to review this project.

Sincerely,

William A. Cook
Acting Director
Secretary's Office of Policy

LETTER TO THE COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO ATTENTION OF:
Planning Division

September 24, 1984

Mr. William A. Cook
Acting Director
Secretary's Office of Policy
Department of Environmental Resources
Commonwealth of Pennsylvania
P. O. Box 2063
Harrisburg, Pennsylvania 17120

Dear Mr. Cook:

I have considered both the comments and recommendations you provided in your letter of August 15, 1984, on the Final Environmental Impact Statement - Locks and Dams 7 and 8 Feasibility Study, Monongahela River Navigation System, Pennsylvania and West Virginia.

I appreciate your concerns over a possible conflict which might develop between hydropower development under existing conditions at Locks and Dams 7 and 8 and our proposed improvements there. We are aware that the Borough of Point Marion has applied for a Federal Energy Regulatory Commission (FERC) license to develop a hydropower project at the existing Monongahela River Dam 8. FERC is aware of the potential conflict. We do not anticipate, however, that our navigation improvements will preclude hydropower or otherwise seriously affect the plans of the Borough. There may be a need for some minor modification of their construction or operating plans, however, we are confident that any conflict will be resolved to the satisfaction of all interests.

In the event that conflicts cannot be resolved, navigation interests would take precedence over hydropower interests since the project is an authorized navigation project and since the navigation benefits would be expected to exceed the hydropower benefits. The Corps is authorized to operate the project to the best interest of all concerned within the confines of law and the authorized purposes of the project. Any FERC hydropower licensee is required by that license to come to an agreement with the Corps on the operation and construction of their facility. This enables us to ensure that the authorized purposes are not infringed upon, that all other interests are considered, and that project safety is maintained.

Likewise, the Corps will do all that it can, consistent with law and authorized project purposes, to ensure the safety and viability of public water supplies during the construction and operation of the new and rehabilitated facilities.

I appreciate your interest in the potential conflicts with water resources interests in the Monongahela pools and I am pleased that you found no major problems in your review of the FEIS. A copy of your letter and this response will be transmitted with my final report to the Secretary of the Army. Thank you for your support of the project.

Sincerely,

E. R. Heiberg III
Lieutenant General, U. S. Army
Chief of Engineers

COMMENTS OF THE STATE OF WEST VIRGINIA

STATE OF WEST VIRGINIA
GOVERNOR'S OFFICE
OF
ECONOMIC AND COMMUNITY DEVELOPMENT
CHARLESTON 25305

D. ROCKEFELLER IV
GOVERNOR

MILES DEAN
DIRECTOR

July 18, 1984
File: PNRS-M
WV840706-032

Lieutenant General J. K. Bratton
Chief of Engineers
ATTN: DAEN-CWP
Department of the Army
Washington, DC 20314

Re: Intergovernmental Review:
Proposed Report - Monongahela River Navigation
System - Pennsylvania & W. Va., Locks & Dams 7
& 8, and FEIS

Dear Lt. Gen. Bratton:

The State Process has reviewed the Poposed Report and FEIS for the above-referenced project, which you submitted to this office in compliance with Public Law 78-534 and Public Law 85-624, and has found the documents to be consistent with State goals and objectives.

A copy of the comments of Mr. Harry S. Cardea, Planner III, Community Development Division, Governor's Office of Economic and Community Development, is enclosed for your further information.

This will certify that the requirements of the State's Intergovernmental Review Process have been met, and the State Process is in concurrence with the Proposed Report and FEIS.

Sincerely,

Fred Cutlip

Fred Cutlip, Director
Community Development

FC:am
Enc.

GOVERNOR'S OFFICE OF ECONOMIC AND COMMUNITY DEVELOPMENT
COMMUNITY DEVELOPMENT DIVISION
WEST VIRGINIA STATE CLEARINGHOUSE
BUILDING 6, ROOM 553B
CHARLESTON, WV 25305
PHONE: (304) 348-4010

PROJECT NOTIFICATION & REVIEW SYSTEM
Review and Comment Form

CLEARINGHOUSE USE ONLY
PNRS NO. WV840706-032
DATE RECEIVED 7/6/84
SUSPENSE DATE 7/20/84
DATE DISPENSED 7/6/84

TO: Thomas E. Holder, Manager
Planning & Development
Community Development

FROM: Fred Cutlip, Director
Community Development

NAME OF PROJECT: Proposed Report - Monongahela River Navigation System - Pennsylvania & W. Va., Locks & Dams 7 & 8

The attached document is referred to your agency for review and comments. If your agency has an interest in this grant application, project, or plan, and desires to comment on it, please check the appropriate box. Your cooperation is asked in returning this memo to the State Clearinghouse Office, indicating your interest or not, 10 days from its receipt.

☐ No comment (Please indicate reason in space #4) ☐ Comments being developed

☒ Comments submitted herewith ☐ Meeting desired with applicant

1. Is this project consistent with the overall goals and objectives as established by your agency? ☒ Yes ☐ No

2. Is there evidence of overlapping or duplication with your or other agencies? ☐ Yes ☒ No

3. To your knowledge, are there any other agencies or jurisdictions whose plans and/or programs might be affected or impacted upon by the proposed project or plan? (Indicate below)

No

4. Reviewers' Additional Comments: (Please use reverse side or separate sheets if necessary)

The Governor of the State of West Virginia, John D. Rockefeller IV, continues to be very supportive of these two lock and dam projects in view of their importance to the State's economy.

REVIEWER'S SIGNATURE Harry O. Carlson DATE 7/17/84

TITLE Planner III TELEPHONE 304-348-4010

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

August 30, 1984

ER 84/848

Lieutenant General J. K. Bratton
Chief of Engineers
ATTN: DAEN-CWP
Department of the Army
Washington, D.C. 20314

Dear General Bratton:

The Department of the Interior has reviewed the Chief of Engineers' Proposed Report, other pertinent reports, and the final environmental statement for the Monongahela River Navigation System, Locks and Dams 7 and 8 Project, Pennsylvania and West Virginia, and finds these documents to adequately describe the existing environmental condition of the proposed project area and the expected impacts thereto.

We note in the Main Report that the mitigation recommendations provided by the U.S. Fish and Wildlife Service (FWS) would be accomplished through standard design practices and provisions for visitor health and safety, with specific management practices to be identified in detail during future engineering studies. Consequently, it is requested that the development of these management practices for mitigating impacts to fish and wildlife resources during the post-authorization stage of project planning be coordinated with the FWS.

The opportunity to review the subject documents is appreciated.

Sincerely,

Bruce Blanchard, Director
Environmental Project Review

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

Washington, DC 20593
Staff Symbol: G-MP-1
Phone: (202) 426-9584

05

September 18, 1984

Lieutenant General J. K. Bratton
Chief of Engineers
Attn: DAEN-CWP
Department of the Army
Washington, D. C. 20314

Dear General Bratton:

The concerned operating administrations and staff of the Department of Transportation have reviewed the proposed report of the Chief of Engineers on Monongahela River Navigation System, Pennsylvania and West Virginia, Locks and Dams 7 and 8 and the Final Environmental Impact Statement. The following comments are provided:

"a. Service bridge over proposed Gray's Landing Lock should provide a minimum of 47 vertical clearance above future normal pool elevation 778.0."

"b. Construction of a pedestrian bridge over proposed Point Marion Lock would require obtaining a Coast Guard Bridge Permit. It should provide a minimum of 47 feet vertical clearance above 797.0."

Thank you for providing us the opportunity to review the report and Final Environmental Impact Statement.

Sincerely,

J. G. SCHMIDTMAN
Captain, U.S. Coast Guard
Chief, Planning & Evaluation Staff
By direction of the Commandant

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
Office of the Secretary of Transportation

400 Seventh St., S.W.
Washington, D.C. 20590

July 10, 1984

Colonel Paul F. Kavanaugh
Corps of Engineers (Planning Division)
Executive Director, Engineer Staff
US Department of the Army
Washington, D.C. 20314

Dear Colonel Kavanaugh:

Thank you for your recent letter to Secretary Dole forwarding a copy of the proposed report of the Chief of Engineers on Monongahela River Navigation System, Locks and Dams 7 and 8, accompanied by a Final Environmental Impact Statement. You indicate that copies have also been sent to the Chief, Planning and Evaluation Staff of the Coast Guard.

I am informed that the report is under review by members of that staff, and that you may expect to hear from the Coast Guard directly. This office has no comments on the Final Environmental Impact Statement.

Sincerely,

Eugene L. Lehr

Eugene L. Lehr, Chief
Environmental Division
Office of Economics

COMMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

September 10, 1984

Lieutenant General J. K. Bratten
Chief of Engineers
ATTN: DAEN-CUP
Department of the Army
Washington, D.C. 20314

Re: COMMENTS - Locks and Dams No. 7 and No. 8 in the Monongahela River Navigation System, Pennsylvania and Virginia (F-COE-D32028-00)

Dear Lt. General Bratten:

Pursuant to the authority granted to the USEPA under Section 309 of the Clean Air Act (P.L. 91-604), we have completed our review of the final Environmental Impact Statement (FEIS) for Locks and Dam No. 7 and No. 8. Our review procedure emphasized three major areas of concern:

1. The evaluation of the rationale for the USCOE selection of the final implementation plan.

2. The detailed assessment of the environmental impacts which the implementation of this project could have in the upper Monongahela River and its adjacent areas.

3. The evaluation of the USCOE responses to the conditions which were proposed in our 25 November 1983 comments to the draft EIS.

Our comments and conclusions are provided for your consideration.

This project initially was rated as LO-2 in the USEPA reference category based on the detailed evaluation of the draft EIS, feasibility study, and technical appendices. We concluded that the tentatively selected plan (the NED plan) for the location of a new lock and dam at the Grays Landing site and the replacement of a lock at the Point Marion site (No. 8) was the most economically feasible alternative. It was also the only project which could be implemented without irreversible adverse impacts to the aquatic/terrestrial biota and habitat of the target area.

Our agreement to the proposal was conditioned by the USACOE resolution of four major issues, which we considered to be central to the implementation of the project. Consequently, in our evaluation of the final EIS and project report, we specifically reviewed the USACOE responses to those issues. Our findings are noted:

1. We recommended the development of a mitigation scheme to minimize fish mortality and increased loss to habitat areas. The USFWS recommendations address our concerns and provide an ample margin of protection for the fish and wildlife in the target area. We concur with those recommendations and note that USACOE will incorporate them through standard design practices.

2. We requested a detailed response for the disposal of spoil from dredging and excavation. The USACOE plan to provide those disposal areas with suitable measures to control erosion is acceptable and should provide ample protection to the surface water sources.

3. We were concerned about the impacts of the project on the aquatic environment of George and Jacob Creeks. The USACOE offered a summary response (p. E-15-44; op. cit.) to our concerns. Since these Creeks have neither a productive fishery nor a substantial quantitative impact to the Monongahela River, the proposed pool raise should not have a major impact to them.

4. We indicated the Agency concern regarding hydropower development at the Locks and Dams No. 7 and No. 8. The hydropower evaluation (p. 51-56, Feasibility Study) has extensively reviewed all of the alternatives for hydrogeneration development at both facilities. We concur with the findings regarding further hydrogeneration at other sites (p. 56; op. cit.).

In summary, after evaluation of the June 22, 1984 submittal of feasibility study, FEIS, and appendices, we reaffirm our findings that the proposed alternative for the development of the new Grays Landing Lock and Dam (R.M. 82.2) and the refurbishing of the Port Marion site (No. 8) is the best alternative to meet the requirements for upgrading navigation on the Monongahela River. In addition, the implementation of the alternative is considered to have the least adverse environmental impact of the all the structural alternatives.

Thank you for the opportunity to review and comment upon this proposed project. Additional questions or comments should be directed to Robert C. Runowski (FTS 8-597-6289) of my staff.

Sincerely,

John R. Pomponio, Chief
Environmental Impact and
Marine Policy Branch

MONONGAHELA RIVER NAVIGATION SYSTEM, PENNSYLVANIA AND WEST VIRGINIA, LOCKS AND DAMS 7 AND 8

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO ATTENTION OF:
DAEN-CWP-A

September 24, 1984

SUBJECT: Monongahela River Navigation System, Pennsylvania and West Virginia, Locks and Dams 7 and 8

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on replacement of Lock and Dam 7 and Lock 8, Monongahela River, Pennsylvania and West Virginia. It is accompanied by the reports of the Board of Engineers for Rivers and Harbors and the District and Division Engineers. These reports are in partial response to a resolution adopted 23 September 1976 by the Committee on Public Works and Transportation of the United States House of Representatives. The Committee requested the Board to review prior reports on the Monongahela River navigation system to determine the need for modifications or improvement of the existing navigation project.

2. The District and Division Engineers recommend that modifications and improvement of the Federal navigation project be authorized for construction in accordance with the plan described in their report. The recommended plan provides for construction of a new lock and dam at river mile 82.2 on the Monongahela River. The new project would be named the Grays Landing Lock and Dam and would replace the existing Lock and Dam 7, which would be removed when construction of the new structure is completed. A new lock would also be constructed at Lock and Dam 8 at river mile 90.8. The existing dam and right bank abutment would be rehabilitated under existing authorities, and the project would be renamed the Point Marion Lock and Dam. Both new lock chambers will be 84 feet wide by 720 feet long.

3. Locks and Dams 7 and 8 are important elements of the Monongahela River navigation system. The existing locks and dams are about 60 years old. The poor structural condition, continuing deterioration of the existing structures, and limited size of the locks indicate that measures are needed to assure the continuation of reliable navigation service. The recommended plan is the most efficient and economical means of solving the structural problems and of meeting present and future navigation needs. The recommended lock sizes will be compatible with the locks at most other structures on the river and will assure efficient operation of the navigation system. The recommended plan is the plan that maximizes net National Economic Development benefits.

4. The Board of Engineers for Rivers and Harbors generally concurs in the findings and conclusions of the reporting officers. However, the Board believes that additional plans should be considered, and that all plans for rehabilitation or replacement should be evaluated against a future base condition which would exist in the absence of any action to rehabilitate or replace Locks and Dams 7 and 8. The Board also believes that uncompensated losses incurred as a result of lock closure during rehabilitation or replacement should be considered as project economic costs. The Board concludes that these procedures would result in a more appropriate measurement of each plan's benefits and costs than that presented by the reporting officers, and requested them to make additional analyses. These analyses have been completed. The Board finds that replacement structures are needed to solve the structural deterioration problems and to provide for continuation of existing navigation service. Total project costs for the recommended plan, based on October 1983 price levels, are estimated at $165,000,000, of which $161,700,000 would be for new construction and $3,300,000 for rehabilitation of Dam 8. Average annual charges, based on an interest rate of 8-1/8 percent and a 50-year period for economic analysis, are $15,955,000. The total annual benefits associated with replacing the existing structures and increasing lock sizes are $61,251,000, and the benefit-cost ratio is 3.8. The Board recommends the plan in accordance with cost sharing and financing arrangements satisfactory to the President and the Congress.

5. The Administration's policy on water project financing and cost sharing is that all Federal water development agencies will continue to seek out new partnership arrangements with the States and other non-Federal interests in the financing and cost sharing of the proposed projects. Each such agency will negotiate reasonable financing arrangements for every project within its respective area of responsibility. In addition, prior commitments to individual States with regard to water development within their borders will be considered and shall be a factor in negotiations leading up to project construction; and, consistency in cost sharing for individual project purposes, with attendant equity, will be sought. Project beneficiaries, not necessarily government entities, should ultimately bear a substantial part of the cost of all project development.

6. I note that the recommended plan is the National Economic Development plan; therefore, I concur in the findings, conclusions, and recommendations of the Board.

7. The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and/or implementation funding.

E. R. HEIBERG III
Lieutenant General, USA
Chief of Engineers

DEPARTMENT OF THE ARMY
BOARD OF ENGINEERS FOR RIVERS AND HARBORS
KINGMAN BUILDING
FORT BELVOIR, VIRGINIA 22060
REPLY TO ATTENTION OF:

BERH-PLN

21 March 1984

SUBJECT: Monongahela River Navigation System, Pennsylvania and West Virginia, Locks and Dams 7 and 8

Chief of Engineers
Department of the Army
Washington, DC 20314

Summary of Board Action

The Board finds that the inland waterway improvements recommended for the Monongahela River Navigation System are economically justified and environmentally and socially acceptable. The proposed plan includes construction of a new lock and dam at river mile 82.2 to be named the Grays Landing Lock and Dam. The new structure will replace Lock and Dam 7. A new lock would also be constructed at existing Lock and Dam 8 at river mile 90.8, and Dam 8 would be rehabilitated. Lock and Dam 8 would be renamed the Point Marion Lock and Dam. Total first cost of the plan is estimated at $165,000,000, of which $161,700,000 would be for new construction and $3,300,000 for rehabilitation of Dam 8. The benefit-cost ratio is 3.8. The Board recommends the plan in accordance with cost-sharing and financing arrangements satisfactory to the President and the Congress.

Summary of Report Under Review

1. Authority. This report is in partial response to a resolution adopted 23 September 1976 by the Committee on Public Works and Transportation of the United States House of Representatives. The Committee requested the Board of Engineers for Rivers and Harbors to review prior reports on the Monongahela River Navigation System to determine the need for modifications or improvement of the existing project. The resolution is quoted in the District Engineer's Report. A final report in full response to the resolution will be submitted later.

2. Description of the study area. The Monongahela River is formed by the junction of the Tygart and West Fork Rivers, about 1 mile south of Fairmont, West Virginia. It flows for about 128 miles in a northerly direction through West Virginia and Pennsylvania to Pittsburgh, Pennsylvania, where it joins the Allegheny River to form the Ohio River. In addition to the Tygart and West Fork Rivers, other major tributaries are the Youghiogheny and

Cheat Rivers which join the Monongahela at river miles 15.6 and 89.1, respectively.

3. Economic development. The study area includes Allegheny, Westmoreland, Washington, Greene, and Fayette Counties in Pennsylvania and Monongalia and Marion Counties in West Virginia. Total population of the area was 2,355,159 in 1980. About 86 percent of the population resides in Allegheny, Washington, and Westmoreland Counties located in the Pittsburgh Standard Metropolitan Statistical Area. About 60 percent of the population is in Allegheny County which encompasses the City of Pittsburgh. Primary economic and employment activities are services, manufacturing, trade, and mining.

4. The two major industries using waterway transportation are coal mining and manufacturing. In 1981, the study area produced about 37.4 million tons of bituminous coal and employed about 16,900 persons in the coal mining industry. Large quantities of coal are shipped from mines located along the upper Monongahela River to iron and steel plants and electrical power generating stations along the lower Monongahela and upper Ohio Rivers.

5. Waterborne commerce. Waterway traffic on the Monongahela River has fluctuated from a low of 26.5 million tons in 1945 to a high of 42.3 million tons in 1970, and in 1980, it was 35.2 million tons. It is anticipated that commerce will increase to about 59.7 million tons by 1990 and 89.8 million tons by year 2040. Historically, about 85 percent of the tonnage shipped on the river is coal, which primarily moves in a downbound direction.

6. Locks and Dams 7 and 8 are important elements of the Monongahela River Navigation System. About 25 percent of total river traffic passes through both locks. Virtually all traffic which passes through Lock 8 also transits Lock 7, while about 90 percent of the traffic passing through Lock 7 also passes through Lock 8. Historically, while the tonnage through both locks has varied from year-to-year, the overall trend has been increasing at a steady rate. Tonnage at Lock 7 was 10.5 million tons in 1982 and is expected to increase to 14.3 million tons by 1990 and 18.6 million tons by 2040. Tonnage at Lock 8 was 8.9 million tons in 1982 and is projected to increase to 11.7 million tons by 1990 and 15.2 million tons by year 2040.

7. Approximately 85 percent of the lockages at both facilities are double lockages, having an average lockage time of 55 minutes and an average delay time of 15 to 20 minutes. By year 2000, average delays at Lock 7 and Lock 8 are expected to increase to about 5.5 hours and 1.2 hours, respectively.

8. Existing and authorized improvements. The first locks on the Monongahela River were constructed in 1840 by private interests. The United States acquired the locks in 1897 and reconstructed and improved the waterway between 1902 and 1932. A second modernization and replacement program was initiated in the late 1940's. The existing navigation project provides for a channel 9 feet deep by means of nine dams, with locks. There are two locks at each of the four dams below Dam 7 and single locks at Dam 7 and upstream dams. Lock sizes are as follows:

a. Lock 2: two chambers, 110 by 720 feet and 56 by 360 feet.

b. Lock 3: two chambers, 56 by 720 feet and 56 by 751 feet (extended from 360 feet).

c. Lock 4: two chambers, 56 by 720 feet and 56 by 360 feet.

d. Maxwell Lock: two chambers, 84 by 720 feet.

e. Locks 7 and 8: single chambers, 56 by 360 feet.

f. Morgantown, Hildebrand, and Opekiska Locks: single chambers, 84 by 600 feet.

The navigation channel varies from a width of 300 feet in the upper reach of the Opekiska pool to practically the full width of the river at the mouth. The navigation season averages about 350 days per year.

9. Locks and Dams 7 and 8 were placed in operation in November and October 1925, respectively. Lock and Dam 7 is located in Pennsylvania at river mile 85.0, about 6 miles downstream of the Pennsylvania-West Virginia State line. The dam has a 610-foot-long fixed-crest uncontrolled spillway. Lock capacity is estimated at about 18.9 million tons per year.

10. Lock and Dam 8 is also located in Pennsylvania at river mile 90.8, just downstream of the Pennsylvania-West Virginia State line. During 1958-1959, the dam was reconstructed to provide a movable crest and to raise Pool 8 by 4 feet. The dam has a 560-foot-wide spillway consisting of a 65-foot-wide uncontrolled section and a controlled section with seven lift gates. Lock capacity is estimated at about 18.3 million tons per year.

11. Other improvements for flood control, water regulation, and hydroelectric power have been constructed by Federal and private interests within the Monongahela River Basin. Tygart Lake, a

Federal project, is located on the Tygart River about 23 miles above its mouth at Fairmont, West Virginia. The lake provides storage for flood control and water for navigation on the Monongahela River. Stonewall Jackson Lake is a Federal multiple-purpose project under construction on the West Fork River, about 73 miles upstream of Fairmont. The project is scheduled for completion in 1987 and would provide flood control, water quality control, water supply, and recreation storage. There are also two private hydropower projects in the basin, the Deep Creek plant of the Pennsylvania Electric Company on the Youghiogheny River and the Lake Lynn plant of the West Penn Power Company on the Cheat River.

12. Problems and needs. The critical problem at Locks and Dams 7 and 8 is structural deterioration. Deterioration has resulted from the physical impact of tows against lock walls; adverse weather conditions, primarily freezing and thawing; acidity of river water due to acid mine drainage; and the age of the structures. These factors result in costly operation and maintenance and there is increased concern as to the ability of the locks and dams to provide safe and reliable navigation service in the future. Damage to the concrete guide, guard, and lock walls at both locks is extensive, and they are seriously deficient in their overall structural stability. Valves, miter gates, operating controls, and embedded metals have deteriorated extensively. In addition, the concrete apron at Dam 7 has been undermined for most of its length. There is surface erosion of the concrete spillway at Dam 7, and leakage occurs through monolith joints. While Dam 8 is generally in good structural condition, exposed concrete has deteriorated and there is evidence of scouring downstream of the dam apron. The right abutment also has stability problems and is in poor condition. Replacement or rehabilitation of both structures is needed as soon as possible, but no later than the early 1990's.

13. Additionally, the existing 56- by 360-foot locks are not commensurate in size with other locks on the Monongahela or Ohio Rivers, nor with the size of barge tows that use the waterway. Larger locks are needed to facilitate the passage of projected commerce and larger tows, to improve operating efficiency by elimination of double lockages, and to reduce existing and future tow delays. The poor navigation approach conditions at Lock 7 also result in inefficient lockages and contribute to tow delays.

14. Improvements desired. Industries and commercial waterway operators believe the deteriorating structures and small lock sizes are serious constraints to the safe and efficient use of the Monongahela River. They desire that existing structures be replaced or rehabilitated, and that larger locks be provided. Development of

new hydroelectric power generating facilities to meet future energy demands is also desired.

15. Alternatives considered. A variety of structural and nonstructural plans were considered to meet commercial navigation needs at Locks and Dams 7 and 8. In addition, the possibility of developing hydropower in conjunction with structural solutions was also evaluated.

a. Structural plans to solve the deterioration problems, thereby maintaining the current level of navigation service, included complete rehabilitation of each lock and dam and replacement structures with the existing lock size (replacement-in-kind). The plans for replacement of Lock and Dam 7 included a new facility at the existing site and at river miles 82.2, 83.6, and 86.8. The plans for replacement of Lock and Dam 8 included a new lock and rehabilitated dam at the existing site, and a new lock and dam at river mile 88.0. A plan which would replace both Locks and Dams 7 and 8 with a single, higher lift facility was also considered at river miles 82.2, 83.6, and 86.8. Following selection of the most feasible sites for replacement-in-kind structures, the reporting officers also evaluated the feasibility of improving navigation service by providing larger lock chambers. Single-lock chambers of 84 by 600 feet and 84 by 720 feet were evaluated for replacement of Lock and Dam 7 at river mile 82.2; replacement of Lock and Dam 8 at its existing site; and replacement of both facilities with a single structure at river mile 83.6.

b. Nonstructural traffic management measures, including a ready-to-serve policy, use of switchboats, and improved scheduling of tow arrivals to increase efficiency of lock operations, were considered. Imposing congestion fees as a means of managing lock use was also evaluated.

c. A wide range of possible hydropower generating capacities was evaluated with the various alternatives. Plans involved either run-of-the-river or a combination of run-of-the-river and peaking power operations. Peaking power generation would utilize peaking releases from the West Penn Power Company's Lake Lynn plant on the Cheat River.

16. Plan of improvement. The District Engineer's recommended plan provides for construction of a new lock and dam at river mile 82.2, to be named the Grays Landing Lock and Dam. The dam would be a concrete gravity structure with a 576-foot-long fixed-crest uncontrolled spillway. The lock would be on the right bank. The new structure would replace Lock and Dam 7 which would be removed when construction of the new facility is completed. The plan also provides for a new lock, landward of the existing

lock at Lock and Dam 8. The existing gated dam and right bank abutment would be rehabilitated, and the structure would be renamed the Point Marion Lock and Dam. Both new lock chambers will be 84 feet wide by 720 feet long. The plan includes visitor facilities at both locations and fisherman-access facilities at the Grays Landing Lock and Dam. The project for Grays Landing Lock and Dam also includes measures to alleviate increased flood damages resulting from raising the pool level between the old and new dams. Those measures include acquisition of flowage easements, floodproofing and raising habitable structures, and fee acquisition of some habitable structures.

17. Economic evaluation. Based on October 1983 price levels, the District Engineer estimates the total first cost of his proposed plan at $165,000,000, of which $161,700,000 would be for new construction and $3,300,000 would be for rehabilitation of Dam 8. The first cost of the new Grays Landing Lock and Dam is estimated at $94,270,000, and the first cost of the new Point Marion Lock and Dam is $70,730,000. Average annual charges, reflecting an 8-1/8 percent interest rate and a 50-year period for economic analysis, are $15,955,000, including $683,000 for annual operation, maintenance, and replacement costs. The District Engineer considered complete rehabilitation of both locks and dams to be the only course of action available in the absence of the proposed plan to ensure continuation of existing navigation service, and identified rehabilitation as the without-project condition for purposes of economic evaluations. The District Engineer estimates that the incremental average annual costs in excess of the cost of complete rehabilitation are $8,090,000. Incremental average annual benefits are estimated at $12,821,000, and the benefit-cost ratio is 1.6.

18. The installation of hydropower facilities at the recommended lock and dams is not economically justified. Also, cost recovery of 70 percent of operation and maintenance expenditures via a uniform systemwide ton-mile fee, and recovery of 70 percent of capital expenditures via a segment-specific ton-mile fee are not expected to result in diversion of any significant amount of traffic from the Monongahela River.

19. Project environmental and social effects. Construction of the proposed project would have a direct impact on 194 acres of terrestrial habitat. There would be a permanent loss of 112 acres of habitat and a temporary loss of habitat value on 82 acres of land used as disposal areas. The navigation pool behind the new Grays Landing Dam would raise the river level by 15 feet for a distance of about 2.8 miles. This would result in loss of 36 acres of shallow-water aquatic habitat and also may have adverse impacts on five archaeological sites. The new lock and dam would require relocation of seven families and would

result in increased flooding of areas upstream of the dam. About 43 habitable structures would be floodproofed or raised to alleviate damages resulting from the flooding.

20. Recommendation of the reporting officers. The District Engineer recommends that modifications and improvements of Locks and Dams 7 and 8 on the Monongahela River be authorized for construction in accordance with the plan described in his report, subject to cost-sharing and financing arrangements satisfactory to the President and the Congress. The Division Engineer concurs.

Review by the Board of Engineers for Rivers and Harbors

21. General. The scope of the Board's review encompassed the overall technical, economic, social, environmental, and policy aspects involved in the modifications and improvements proposed by the reporting officers. The Board considered the report's conformance with the Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and compliance with other applicable administrative and legislative policies and guidelines. The Board also considered the views of interested parties, including Federal, State, and local agencies.

22. Responses to the Division Engineer's public notice. The Division Engineer issued a public notice on 6 January 1984 stating the findings and recommendations of the reporting officers and inviting public comment to the Board. Thirteen letters were received in response to the notice. All correspondents were generally in favor of the proposed project. Most expressed concern over the deteriorating and undersized locks and the costly disruption to the economy of the region and the Nation if the existing locks were inoperable. The letters included correspondence from both U.S. Senators from Pennsylvania and West Virginia, a U.S. Senator from Ohio, Members of Congress from both Pennsylvania and West Virginia, the Governor of West Virginia, and a representative of the Marion County Commission. A representative of the Carnegie Museum of Natural History expressed concern for archaeological sites known to exist in the project area, but believed the reporting officers have taken into account any possible impacts that construction would have on cultural resources. A resident of the project area expressed concern over increased flood damages resulting from construction of the new Grays Landing Lock and Dam, and the use of flowage easements to alleviate this effect. A representative of the Monongahela Railway Company expressed concern that the increased pool level upstream of the new Grays Landing Lock and Dam may have adverse impacts on railroad embankments and drainage structures in the new pool area.

23. Findings and conclusions. The Board of Engineers for Rivers and Harbors generally concurs in the findings and conclusions of the reporting officers for replacement of Lock and Dam 7 and Lock 8, and for rehabilitation of Dam 8. The recommended modifications and improvements are economically justified, technically sound, and environmentally and socially acceptable. The Board believes the proposed plan will result in lower transportation costs and will contribute to the economy of the region and the Nation.

24. The Board requested the reporting officers to consider additional plans that might be undertaken to maintain navigation service at the existing locks and dams. The Board also requested the reporting officers to evaluate all plans against a future base condition which would exist in the absence of any action (rehabilitation or replacement) to solve the structural deterioration and navigation problems at Locks and Dams 7 and 8. In addition, the Board believes that any uncompensated National Economic Development (NED) losses incurred as a result of rehabilitation or replacement of the existing projects should be accounted for as an economic cost of that alternative. The Board finds that the evaluation procedures it requested are a more appropriate way of determining the level of navigation service that should be provided at Locks and Dams 7 and 8 in the future. The reporting officers provided the results of this evaluation as a supplement to their report. Resultant average annual benefits are estimated at $61,251,000.

25. Locks and Dams 7 and 8 are about 60 years old, have deteriorated significantly, and have incurred continuous and costly maintenance and repair. Those costs and the period of time the locks would be shutdown to make repairs will become progressively greater in the future. The reporting officers find that deterioration and deficiencies in structural stability will soon become critical and that there is a high probability of structural failure. Rehabilitation of the existing structures or replacement with new structures is necessary to insure the continuation of existing navigation service through this important segment of the Monongahela River Navigation System. The reporting officers have provided supplemental information that shows that their recommended plan is the most effective means of alleviating the structural deterioration problems and of providing for continuation of existing navigation service, as well as, providing for additional transportation savings to the Nation. The Board reviewed the rehabilitation alternatives, and believes it would not be advisable for the Federal Government to invest such large sums of money in obsolete structures due to the risks and uncertainties associated with rehabilitation, and the significant NED economic costs that would be incurred by industries and waterway operators during the time the locks would be shutdown for rehabilitation.

26. The plan recommended by the reporting officers maximizes net NED benefits and would result in minimal damage to aquatic and terrestrial habitat. It does not require separable fish and wildlife mitigation measures.

27. At this time, hydropower development at the recommended locks and dams is not economically justified. The reporting officers intend to design and construct the dam abutments so as not to preclude the possibility of installing hydropower facilities in the future. They believe the design considerations would be minor and would not increase the cost of the project by a significant amount. Such provisions are prudent in that they would allow for later addition of hydropower facilities, if found to be economically feasible, with minimum adverse impact on the operation of the locks and dams. The Board concurs.

28. The Board agrees with the reporting officers that both the Grays Landing and Point Marion Locks and Dams are needed to realize project benefits and that both structures should be considered as a single project. Total first costs of the navigation improvements, based on October 1983 price levels, are estimated at $165,000,000, of which $161,700,000 would be for new construction and $3,300,000 for rehabilitation of Dam 8. Average annual charges, based on an interest rate of 8-1/8 percent and a 50-year period for economic analysis, are $15,955,000. Total average annual benefits to be realized by replacing the existing structures and increasing lock sizes are $61,251,000, and the benefit-cost ratio is 3.8.

29. The water project financing and cost-sharing policy of this Administration is as follows:

a. All Federal water development agencies will continue to seek out new partnership arrangements with the states and other non-Federal interests in the financing and cost sharing of all proposed projects. Each such agency will negotiate reasonable financing arrangements for every project within its respective area of responsibility.

b. Prior commitments to individual states with regard to water development within their borders must be considered and shall be a factor in negotiations leading up to project construction.

c. Consistency in cost sharing for individual project purposes, with attendant equity, will be sought.

d. Project beneficiaries, not necessarily governmental entities, should ultimately bear a substantial part of the cost of all project development.

30. Recommendation. The Board recommends that improvements for inland waterway navigation at Locks and Dams 7 and 8, Monongahela River Navigation System, be authorized for implementation, generally in accordance with the plan of the reporting officers, with such modifications as in the discretion of the Chief of Engineers may be advisable, and in accordance with cost-sharing and financing arrangements satisfactory to the President and the Congress.

FOR THE BOARD:

RICHARD M. WELLS
Major General, USA
Chairman

REPORT OF THE DISTRICT ENGINEER

SYLLABUS

This study investigated the feasibility of navigation modifications in the Upper Monongahela River, at Lock and Dam 7 and Lock and Dam 8.

The existing navigation projects within the study reach are located at River Mile 85.0 (Lock and Dam 7) and River Mile 90.8 (Lock and Dam 8). Both structures consist of a single, 56-foot x 360-foot lock completed and put in service in 1925. Dam 7, with its fixed crest structure, maintains a 15-foot lift between pools. Dam 8 was modernized in 1959 when a gated structure was built on the original fixed crest dam, providing a 19-foot lift between pools.

The primary water resource concern and need identified during this study is the continuation of reliable navigation service through this portion of the Monongahela River System. An additional concern was the opportunity for hydropower development, as it relates to the study area's navigation function.

The age, continuing deterioration and marginal structural integrity of each lock requires that expedited action be initiated early to insure the availability of a safe and dependable navigation facility for the waterway users. A number of measures that would alleviate the problems existing at Locks and Dams 7 and 8 were investigated. The measures varied from nonstructural actions to total lock and dam replacement.

Although the locks do not have any significant congestion problems and associated delays at the present time, increased delays are projected to occur as early as 1990. Implementation of any nonstructural measure would address only these delay problems and would not relieve the major problem of overall condition and marginal structural integrity. Therefore, all nonstructural measures were eliminated during the study plan formulation.

As a comparison with rehabilitation and continued use of the existing structures, a number of replacement plans were investigated at various site locations. The two most feasible plans were selected for detailed analysis.

1. A new lock and fixed crest dam at the Grays Landing site (r.m. 82.2) to replace existing Lock and Dam 7 (r.m. 85.0). A new lock at the Point Marion site (existing site of Lock and Dam 8 at r.m. 90.8) to be constructed landward of the existing lock which it replaces.

2. A new lock and a gated dam to replace both Lock and Dam 7 and Lock and Dam 8.

Different lock sizes were evaluated for the above two plans for comparison with rehabilitation to determine the alternative which would produce the maximum net benefit.

e plan with an 84-foot x 720-foot lock chamber and a fixed crest dam to
named the Grays Landing Lock and Dam to replace existing Lock and Dam 7,
d an 84-foot x 720-foot lock chamber to be located landward of the
isting lock to be replaced at Lock and Dam 8 and to be renamed the Point
rion Lock and Dam has been designated as the selected plan. This plan
ximizes net benefits and, therefore, is the National Economic Development
lan, and is the least detrimental to the environment of all the replace-
ent plans considered.

he selected plan has an estimated total cost of $165,000,000. Average
nnual economic costs, including operation, maintenance, and extraordinary
aintenance are estimated at $15,960,000. The incremental average annual
ost (increase over the base condition cost) would be $8,090,000, with a
orresponding average annual benefit of $12,820,000. This plan is economi-
ally feasible, with incremental net benefits of $4,730,000 and a benefit-
ost ratio of 1.6.

n addition to the information and analyses contained in the MAIN REPORT
nd APPENDICES, an attached SUPPLEMENT presents additional detail for two
pecific areas of project formulation and evaluation. These areas are:

1. A detailed presentation of additional rehabilitation schemes including variations of construction seqdences and durations to insure the development of the most probable rehabilitation plan for comparative purposes; and

2. An economic evaluation of all the rehabilitation and replacement alternatives considered using a different base condition from that used for the analysis in the MAIN REPORT. The SUPPLEMENT presents additional data on a condition that would prevail over the planning period in the absence of the implementation of any plan to solve the structural deterioration and navigation problems at the existing Locks and Dams 7 and 8. The SUPPLEMENT'S approach provides a more direct presentation of the total costs and the total benefits associated with each alternative. An additional change from the MAIN REPORT'S economic analysis concerns the treatment of the economic costs associated with the impact of lock chamber closure on the users of this portion of the waterway system. The SUPPLEMENT'S analysis treats these impacts as Other Direct Costs for the various rehabilitation alternatives. The MAIN REPORT, however, presents these impacts as alleviated costs, or benefits, but only for the alternative plans that do not require lock closure.

Based on the SUPPLEMENT'S economic analysis, the recommended plan of the MAIN REPORT provides total annual benefits of $61,250,000 at a total annual cost of $15,950,000. This plan is the NED plan, with net benefits of $45,300,000 and a benefit-cost ratio of 3.8.

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MONONGAHELA RIVER NAVIGATION SYSTEM
PENNSYLVANIA AND WEST VIRGINIA
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

SECTION I. INTRODUCTION

1. GENERAL

The Monongahela River is formed by the junction of the Tygart Valley and West Fork Rivers at Fairmont, West Virginia and flows in a northerly direction to join with the Allegheny River at Pittsburgh, Pennsylvania in forming the Ohio River. Draining an area of 7,386 square miles, the river falls a total of 147 feet in its 128.7 mile length. The river area covered by this report extends from River Mile (r.m.) 61.2 (Maxwell Locks and Dam) to r.m. 90.8 (Lock and Dam 8). Major tributaries joining the main stream within this river reach include Ten-Mile and Dunkard Creeks and the Cheat River. Commercial navigation is currently provided for only on the main stem of the Monongahela River by means of a lock and dam system which maintains a minimum channel depth of nine feet throughout and a width of approximately 300 feet within the project area. An index map and general plan and profile of the Monongahela River Navigation System is shown on PLATES 1 and 2, respectively. Tows are generally able to operate the year-round on the river with exceptions occurring only during infrequent periods of high water or heavy ice when navigation becomes hazardous or lock facilities become inoperable. Severe fog conditions also interfere somewhat with the operation of tows.

This feasibility report documents the results of studies undertaken to examine river transportation needs and the relationship of those needs to a recommendation for the future management and development of the river area encompassing existing Locks and Dams 7 and 8.

2. STUDY AUTHORITY

This report of Locks and Dams 7 and 8 was prepared as an interim effort under an authorizing resolution adopted by the Committee on Public Works and Transportation of the United States House of Representatives on 23 September 1976 as follows:

> "Resolved by the Committee on Public Works and Transportation of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports of the Chief of Engineers on the Monongahela River navigation system, printed as House Document Number 209, 50th Congress, Second Session, House Document Number 288, 67th Congress, Second Session, House Document 22, 70th Congress, Second Session, Senate Document Number 100, 81st Congress, First Session, and other pertinent reports with a view toward determination of the need for modifications or improvement of the existing project at this time."

3. SCOPE OF STUDY

The purpose of this interim study was to examine Locks and Dams 7 and 8 on the Monongahela River to determine their overall condition, the level of navigation service they currently provide and at what level that service should optimally continue.

The studies presented in this report were limited to the navigation and related water resource problems and needs within the confines of the project reach between Maxwell Locks and Dam and Lock and Dam 8; with specific emphasis on feasible alternative actions which could be implemented to provide for these needs; an assessment of the impacts associated with each alternative action, and finally, the recommendation of a specific plan of action that best fulfills the needs of the area.

Studies accomplished for this report were made only to the extent necessary to determine feasibility and allow plan selection. More detailed design studies would be made in any post-authorization process.

4. PUBLIC INVOLVEMENT AND COORDINATION

The Pittsburgh District, Corps of Engineers had the principal responsibility for conducting and coordinating this study, and for plan formulation, consolidation of information from prior studies (both Corps of Engineers studies and those of other agencies), preparation of the report and Environmental Impact Statement (EIS) and the development of report recommendations.

Initial coordination efforts included a meeting held on 18 March 1980 with the Pennsylvania Department of Transportation, the Southwestern Pennsylvania Regional Planning Commission and numerous railroads located within the study area to coordinate the Monongahela River studies (which included Locks and Dams 7 and 8), along with alternative transportation modes which could be impacted upon by changes occurring to the waterway system.

At the beginning of the feasibility study, a public involvement program, described in APPENDIX L, was developed to provide information to the public and to encourage active involvement by all interested parties. The District continued coordination with appropriate Federal, State and local agencies and private industry, a process which began during the mid-1960's. Contact was also maintained with the local news media, and several newspapers published articles about the October public meeting and other events. In addition, two fact sheets, one containing the announcement of the public meeting, were prepared and distributed to a mailing list consisting of Congressional interests; Federal, State and local agencies; news media; businesses; industry and others.

On 19 October 1983, a public meeting was held in Point Marion, PA to discuss the status of the feasibility study and to obtain comments from the public. This meeting was preceded by the District establishing four "Information Centers" at four separate locations for the convenience of

area residents. These centers offered an additional opportunity for the public to review and comment on the draft report and inquire about specific issues. Generally, those attending the public meeting were in accord with the study findings which were presented. However, some property owners expressed concern about the Corps' estimation that the proposed Grays Landing structure would raise the level of the Monongahela River 15 feet. A record of the proceedings of the public meeting is contained in APPENDIX L.

5. PRIOR STUDIES AND REPORTS

The Locks and Dams 7 and 8 Feasibility Study has evolved from a number of previous studies, dating back as far as 1897, when the Federal Government first acquired the Monongahela River navigation system. However, since many of these navigation studies are so outdated, only those conducted by the Corps of Engineers since the 1950's will be chronicled in the following.

A study by the Pittsburgh District concerning the replacement of certain locks and dams was documented in a report titled "Preliminary Design Memorandum, Reconstruction of Locks and Dams, Middle Monongahela River, Pennsylvania," July 1956. This report concentrated on the replacement of existing locks and dams that were approaching the end of their useful life or which, due to constantly increasing traffic demands, had insufficient capacity. A revised report dated May 1957, recommended the construction of the Maxwell Locks and Dam to replace Locks and Dams 5 and 6, and the reconstruction of Dam 4 to accomplish the raising of Pool 4 by six feet. It also recognized the need for the replacement of Lock and Dam 7 (at a later date) by a new project at Grays Landing, Pennsylvania with a single, 84' x 720' chamber. As a result of this report, the modernization of the middle Monongahela River was authorized and construction of Maxwell Locks and Dam was initiated in 1960.

Further study of the Locks and Dams 7 and 8 river reach culminated in a report which recommended the construction of Grays Landing Lock and Dam to replace Lock and Dam 7, and a larger lock to replace the existing lock at Lock and Dam 8. This report titled "Replacement of Lock and Dam 7 and Lock 8, Monongahela River, Pennsylvania", was completed in May 1970. The Secretary of the Army approved this report and authorized the recommended construction in November 1973. However, in January 1977, following comments by the Court during litigation relative to the proposed replacement of Locks and Dam 26 on the Mississippi River at Alton, Illinois, the Secretary of the Army rescinded his authorization of the two Monongahela River replacement projects and directed that documentation be prepared for submittal to the Congress for authorization if replacement action were recommended.

Since a considerable amount of time had elapsed since the studies for the 1970 Report were accomplished, the decision was made by the Chief of Engineers to reanalyze the Monongahela River Navigation System to update the information and determine if the earlier report findings were still valid.

In January 1981 a Reconnaissance Study of the entire Monongahela River Navigation System was completed. This study determined that a number of problem areas exist within the Monongahela River Navigation System that warranted detailed investigation with the most critical area being in the upper reach of the river in the vicinity of existing Locks and Dams 7 and 8. The detailed investigation of the Locks and Dams 7 and 8 problem is the subject of this particular report document.

6. THE REPORT AND STUDY PROCESS

This report documents the studies undertaken and the results obtained for review and action by Federal and State decisionmakers. More specifically, the report will be transmitted to and reviewed by the following: Corps of Engineers — Ohio River Division, Board of Engineers for Rivers and Harbors, and Chief of Engineers; Secretary of the Army; Office of Management and Budget; and the Congress. This review process also includes several additional steps to obtain further comments from the general public and local, state and other Federal agencies. Upon completing his review, the Division Engineer will issue a public notice setting forth the findings of the study and inviting views and comments to be furnished to the Board of Engineers for Rivers and Harbors.

The Chief of Engineers, after receiving the Report of the Board, will furnish copies of the report to the Governors of Pennsylvania and West Virginia and interested Federal agencies for their formal review and comments. After receipt and consideration of all comments, including a review by the Office of Management and Budget, the Secretary of the Army would transmit the report to the Congress for their subsequent action.

In the interest of clarity for presentation and reference, this report has been arranged into a Main Report, Draft Environmental Impact Statement (DEIS) and 11 technical appendices. The main report is a nontechnical presentation, of the overall study and contains the recommendations of the reporting officer. The 11 appendices augment the main report information with detailed data and analysis. The technical appendices for the report are as follows:

APPENDIX A - PROBLEM IDENTIFICATION
APPENDIX B - STRUCTURAL CONDITION - REHABILITATION
APPENDIX C - GEOTECHNICAL
APPENDIX D - HYDROLOGY
APPENDIX E - HYDRAULICS
APPENDIX F - CONDITION SURVEY - LOCK 7 AND LOCK 8
APPENDIX G - SOCIAL AND ECONOMIC RESOURCES
APPENDIX H - PLAN FORMULATION AND EVALUATION
APPENDIX I - COST ANALYSIS
APPENDIX J - BENEFIT EVALUATION
APPENDIX K - FISH AND WILDLIFE RESOURCES
APPENDIX L - PUBLIC INVOLVEMENT

SECTION II. PROBLEM IDENTIFICATION

1. GENERAL OBJECTIVES

The overall objective of this study effort is the development of a report for the Congress. In the report, it is necessary that Federal water and related land planning be directed to contribute to National Economic Development (NED) consistent with protecting the Nation's environment. Additionally, the Principles and Guidelines for Water and Related Land Resources Planning establishes four accounts, for which the effect of each alternative plan shall be addressed, to facilitate evaluation of each plan. These accounts are: (NED), environmental quality (EQ), regional economic development (RED), and other social effects (OSE).

2. SPECIFIC STUDY OBJECTIVES

This navigation study is neither totally comprehensive in nature nor basin wide in its extent; therefore, any problem areas that exist outside the range of a demonstrable relationship to the Locks and Dams 7 and 8 study area have not been addressed. Within the study area, only those problems and needs related to navigation and its associated water resources were considered. Any problems or needs, however, that affect or could be affected by solutions to any navigaton problem, or that reflect an alternative use of the same resource have and will continue to receive appropriate consideration.

An examination of the existing problems and concerns of the study area indicate a need for more specific planning objectives. These criteria reflect not only the overall objectives established for the Locks and Dams 7 and 8 study, but also encompass national, state and local views, where possible, for alleviating problems and realizing opportunities. The specific objectives are as follows:

Determine existing commodity shipments, their origin and destination and the volume that is predicted to move on the Monongahela River and specifically through Lock 7 and/or Lock 8 in future years.

Determine the physical condition of Locks and Dams 7 and 8 and the capacity of existing Locks 7 and 8.

Determine the navigation problems imposed by channal geometry, projected traffic, projected navigation equipment and/or lock sizes.

Determine when and where lock delays are or could initially begin.

Determine when or if traffic (when restricted by lock delays) would divert to other modes of transportation.

Determine the effect of changing waterway capacity (increase or decrease) on other modes of transportation.

Determine the waterway improvements required to meet the needs of commercial navigation.

Determine the hydropower potential at any proposed new facility.

Determine the effect of waterway improvements on shoreside facilities, riverbank stabilization, water-oriented recreation and water supply.

Preserve or enhance water quality, scenic areas and fish and wildlife.

Avoid or mitigate increasing flood damage.

3. STRUCTURAL CONDITIONS

a. General. Locks and Dams 7 and 8 are over 50 years of age. These structures were built to different, and generally lower, standards than those used today. Both the design criteria and construction quality control in existence at the time of construction would be unacceptable by today's standards. The concrete does not contain entrained air for durability, and was literally "poured" in the forms with limited control on water-cement ratios, consolidation, or lift joint preparation. Wall sections are unreinforced. Analysis of the relatively thin sections, adjacent to necessary galleries and culverts, show high levels of tensile stresses, most of which exceed safe levels. Further, the vertical faces of all walls exposed to impact and abrasion from barges do not contain protective wall armor. Under these conditions, deterioration started at an early stage and has accelerated with time. Until the late sixties, the concrete and steel features below water were exposed to severe acid mine drainage related acidic conditions. Ph values as low as 3.5 prevailed for many years, particularly during low flow stages. The continual deterioration of these aged structures, as well as the changes that have occurred in the character of river traffic since the structures were designed, such as the increased volume of traffic, the growth in tonnage, the increased size of tows, and the distribution of movements over the whole year under varied conditions of stream flow, all contribute to present structural and operational problems. The following paragraphs detail the specific structural concerns for Locks and Dams 7 and 8.

b. Lock and Dam 7.

(1) Concrete - Concrete damage is considered extensive on and near the top surfaces of the guide, guard, and lock walls; it is moderate on vertical surfaces. Deteriorated concrete prevails over 90% of the top surfaces to depths varying from a few inches to a maximum of two feet. On vertical surfaces, the deterioration is less severe, both in depth and extent. However, vertical monolith joints exposed to barge wear are severely spalled and gouged, as are several areas of the miter gate recesses and other features in the walls, such as at ladders. Concrete deficiencies (i.e. spalls, severe scaling, transverse and longitudinal cracks, and random and pattern cracking) exist in both the concrete repair overlays and in the original concrete. Serious structural cracks exist in the lower end of the river wall from the top of the wall through the gallery and culvert down to the river bed. One of these cracks is open as

much as one inch. Other structural cracks occur in the thin, unreinforced sections of the valve and bulkhead monoliths and around the gate anchorages. The computed high tensile loads (as noted earlier) on all unreinforced thin wall sections (the probable cause of the above cracks) could add to the cracking problem leading to a precipitous failure of a wall section.

(2) Stability - The lock walls are founded on moderately hard shale which is highly broken. A stability investigation of representative land wall, river wall, and dam monoliths indicated several areas of serious concern. All land wall monoliths (with the exception of the upper gate monolith) and all river wall monoliths failed to meet stability criteria for both normal operating and extreme maintenance conditions. Computed percentages of active base values in overturning are as low as 25% for the typical land wall section (standards require 75%). Factors of safety in sliding are as low as 0.6 when they should be 2.0, again for the typical land wall section. Additionally, the lower gate monolith and the most downstream monoliths of the river wall have been undermined to an as yet undefined extent on the river side. This latter situation further aggravates the already serious instability condition of the lock walls.

By a similar analysis the miter and guard sills are dangerously unsafe regarding both stability and sliding factors of safety.

(3) Conditions of Metal Structures - Valves, miter gates, and embedded metal have extensive deterioration, due to corrosion caused by years of exposure to high levels of acidic water. Butterfly valves and manually operated controls for the miter gates are also in very poor condition.

(4) Dam and Abutment - Based upon the latest soundings and divers' inspections taken adjacent to the downstream end of the dam, there is evidence of riverbed scour. The dam apron is undermined over most of its length up to nine feet, thus jeopardizing its integrity. Dam stability would be of an acceptable level, however, except for the adverse effect of the extensive downstream riverbed scouring. Surface erosion of the concrete in the fixed crest dam has also occurred, with considerable leaking observed through the monolith joints. The abutment of the dam is badly deteriorated and is unsafe due to low resistance to overturning.

c. Lock and Dam 8.

(1) Concrete - Concrete damage is very extensive on all exposed surfaces of the guide, guard, and lock walls. Deteriorated concrete occurs over 80% of the top surfaces of the walls to depths varying from over one foot to a maximum of three feet. On the land wall, recent surface overlays somewhat mask this serious deterioration. The top surfaces of the river and guide walls are spalled and deteriorated and contain severe scaling, with transverse, longitudinal, random, and pattern cracking. Structural cracks exist at the thin, unreinforced wall sections of valve and bulkhead recesses, at gate anchorages, and at corners of openings and recesses. On

vertical surfaces, concrete deterioration is also very serious. Deteriorated concrete extends over 75% of these surfaces to depths varying from several inches to a maximum of three feet. The surfaces are badly spalled, gouged, and eroded from several inches to as much as one foot. Vertical joints, corners, and edges of recesses are spalled and gouged from nine to 12 inches, and to more than two feet in certain localized areas. Cracks and weak horizontal joints are present in most monoliths, the extent of which is indicated by the flooding of the river wall gallery that occurs each time the chamber water level is raised to upper pool. Of particular significance is the extensive deterioration at the gate recesses and at the gate and machinery anchorage areas.

(2) Stability - The lock walls and sills are founded on a weak indurated clay layer underlaid by a thin coal seam. The strength parameters of these materials, as determined by the Waterways Experiment Station tests, are extremely low. Some of the core borings revealed very poor contact zones between the concrete and the indurated clay. A stability investigation of representative land wall, river wall, and lock sill monoliths indicates unsafe conditions, in both normal operating and extreme maintenance conditions. (It should be noted that the upper pool was raised four (4) feet in 1958, thus imposing additional loading on the structure. Although carbon steel rock anchors were installed in the river wall and in the upper and lower gate sills at the time of the pool raise, the usefulness of these anchors after 25 years is questionable. Corrosion is likely to have occurred, significantly reducing their cross-sectional area and effective load-carrying capacity.)

(3) Internal Stresses - Using the designed structure configuration, an analysis of Lock 8 indicates, as at Lock 7, that tensile stress levels around culvert openings are high. Considering the observed concrete deterioration of up to three feet and the surface spalling and gouging, the effective wall thickness upon which these stresses reacted would be much reduced. Thus, the stress levels in the remaining reduced effective sections are likely to be at much higher levels. At some point, with such weakening and an unusual loading condition, the sections could suddenly reach the failure level.

(4) Condition of Metal Structures - Valves, miter gates, and embedded metal have extensive deterioration, due to corrosion and normal and abusive wear and use. The corrosion problem was aggravated by the earlier noted high level of acidity in the water. Butterfly valves and miter gate operating machinery and manual controls are also in very poor condition as would be expected after long years of use and abuse in a harsh environment.

(5) Dam and Abutment - The concrete in the piers of the dam and service bridge is in generally good condition. However, exposed concrete remaining from the original dam is in poor condition, with cracks and extensive spalling. Sections of the original dam, incorporated as gate sills for the present dam, and the piers of the existing dam fail to meet sliding stability criteria. Areas of scour immediately below the dam are also evident and could eventually lead to more serious stability problems. The abutment monoliths are unsafe, due to inadequate resistance to overturning and sliding. The abutment concrete is in very poor condition, requiring extensive repair.

d. Concern Over Continued Operation and its Related Risks. The preceding paragraphs succinctly summarize the known problem areas, deficiencies, and structural weaknesses existing at Locks and Dams 7 and 8. A more detailed and extensive coverage is contained in APPENDICES B, C, and F attached. The results of the structural review of these two aged facilities clearly indicate a need for extensive action to insure the availability of a safe and dependable navigation facility at these two locations. The risk of a major failure in several vital components has been present for some time and becomes more critical as time and use further weaken these structures. While a precise prediction cannot be made of the moment when failure would be imminent, available knowledge points to a risk and concern which is far too great to be further ignored. While there is a need and urgency for some immediate action, the District believes that expedient, stop-gap measures would not be sufficient nor productive. Simple dewatering of the lock chamber to effect normal or emergency repairs involves significant preparatory procedures. The lock guard sills are inadequate to support the closure dams, and the lock walls may be unable to support the more severe loading induced by the lock dewatering. Sheet pile cell-type closures would have to be constructed at the upper and lower ends of the lock chamber, and the lock walls would have to be anchored and strutted before dewatering could be initiated. Under these conditions, and considering already high internal stresses, even superficial and nominal repairs would involve a high risk of failure. Thus, it is apparent that expedient-type repairs would necessarily be of a superficial nature, cosmetic in value, of dubious durability, and undertaken at high risk. These repairs could also generate a false sense of security by temporarily covering real deficiencies and weaknesses.

4. RECREATIONAL AND VISITOR FACILITY NEEDS

a. Recreational Needs. Recreational usage of Pools 7 and 8 has been decreasing over the last decade. The most significant contributor to this trend appears to be the lack of safe, controlled and maintained access. Currently, public boating access is limited to three sites in the upper portion of Pool 8 with no access in Pool 7. Access needs can be satisfied under the existing authority for cost-shared recreational development at completed projects using the master planning and Code 710 programs.

b. Visitor Facility Needs. Public access to the lock and dam operational lands and support facilities for public health and safety are needed for viewing project operations, associated picnicking and use of the tailwater fisheries. Access and support facilities are addressed in this report and will be furnished as a project cost.

5. FISH AND WILDLIFE NEEDS

For most of this century, acid drainage, industrial effluents and domestic pollution severely degraded water quality in the river. As a result, all but the most tolerant aquatic fauna were eliminated. Environmental controls and cleanup efforts were begun a few years ago and have improved the water quality and allowed recolonization of the river by fish and other aquatic fauna.

Aquatic habitat, within the study area, ranges from good, gravel and stone riverbed, to poor, silt and mud bottoms. Most of the river lacks the important habitats for fish, such as submerged boulders or trees.

Angler use of the river, between Locks and Dams 7 and 8, has increased substantially since 1975 but is hindered from attaining further growth because of the lack of access facilities. If facilities were added, they would greatly enhance the potential use of this developing resource.

The terrestrial wildlife habitats within the study area surrounding Locks and Dams 7 and 8 are about average overall when compared with other similar habitats in southwestern Pennsylvania. While added habitat is not presently necessary, care should be taken to avoid to the maximum extent possible the destruction of the existing resource in the development of any alternative plan.

The recommendations of the Fish and Wildlife Service, as set forth in their letter dated 22 November 1983 (located in APPENDIX K - FISH AND WILDLIFE RESOURCES), are generally acceptable to the Corps, with the exception of recommendation No. 4. This measure includes angler access and parking facilities at Dam 8. The recommended project, as designed, would not affect present access at Dam 8. Therefore, additional access will not be developed because it would be considered enhancement. However, because of maintenance requirements, an access road to the abutment end of the new Grays Landing Dam will be provided. This will allow fishermen access to the tailwaters, and for this reason, minimum facilities for health and safety would be provided.

6. SOCIAL-ECONOMIC RESOURCES

The seven county study area (Allegheny, Westmoreland, Washington, Greene and Fayette Counties in Pennsylvania, and Monongalia and Marion Counties in West Virginia) consists of approximately 4,665 square miles in land area, and had a total population of 2,526,585 in 1960; the 1980 census identified a population of 2,355,159 for the area, indicating a decrease of 171,426 in two decades. The highest population density is in the largely urban Allegheny County which encompasses the City of Pittsburgh. Population densities per square mile in the study area vary from an average of 787 for the counties located in the Pittsburgh Standard Metropolitan Statistical Area (SMSA) (Allegheny, Washington and Westmoreland Counties) to 166 for the non-SMSA counties (Fayette, Greene, Monongalia and Marion Counties).

In 1980, the civilian labor force of the study area consisted of 1,057,057 persons with an unemployment rate of 7.6 percent. Fayette and Greene Counties had the highest unemployment rate with 11.8 percent and 9.8 percent, respectively. TABLE 1 identifies the 1980 employment statistics by type of industry for the SMSA and non-SMSA portions of the study area. As TABLE 1 indicates, major industries include: Services, Manufacturing, and Trade. The biggest difference between the SMSA and the non-SMSA employment is in the Agriculture and Mining Industry category (of this category, approximately 70 percent are employed in mining). The SMSA's portion share of employment for this industry is two percent while the non-SMSA portion accounts for 13 percent. This high percentage of employment in the mining industry is indicative of the heavy reliance on coal and coal associated industries in the Upper Monongahela River Basin.

TABLE 1

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

EMPLOYMENT BY INDUSTRY 1980 1/

Industry	SMSA Counties	Non-SMSA Counties	Total
Agriculture & Mining	16,086	15,749	31,835
Construction	45,336	6,851	52,187
Manufacturing	208,477	22,470	230,947
Transportation, Communications and Utilities	65,443	8,476	73,919
Trade	185,710	22,985	208,695
Finance, Real Estate and Insurance	48,443	3,915	52,358
Services	258,159	34,555	292,714
Public Administration	29,746	4,468	34,214
TOTAL	857,400	119,469	976,869

1/ U.S. Census of Population and Housing, Advance Estimates 1980.

7. COMMODITY FLOWS

a. Commodities Studied. The predominant commodity being transported through Locks 7 and 8 on the Monongahela River is bituminous coal. In 1980, this commodity accounted for 88 percent of the Lock 7 traffic and 86 percent of the Lock 8 traffic. The two major uses of this coal are for the production of electrical energy and the manufacture of coke for pig iron and other metal processes. However, due to the recent recession and the related slump in steel production, the majority of the coal currently being shipped through these two projects is being used for electrical generation. The other major commodities which traverse the locks include petroleum products, and aggregates (including limestone, phosphate, cement, and sand and gravel).

b. Historical Commerce. The commercial history of Locks 7 and 8 for the period 1962 through 1982 is shown in TABLE 2.

Total annual tonnage during this time frame fluctuated from a minimum of 6.4 million tons in 1962 to a maximum of 10.5 million tons in 1982 for Lock 7, and 4.4 million tons in 1962 to 8.9 million tons in 1982 for Lock 8. This extreme fluctuation is related, in general, to strikes, steel plant modernizations (requiring less coal per ton of steel), both the decreased and then the increased use of coal to generate electrical power (change in use of oil) and the national economic situation.

Historically, both structures exhibit a commonality of traffic moving in the upper river. While all of the traffic traversing Lock 8 also passes through Lock 7, approximately 90% of Lock 7's traffic passes through Lock 8.

c. Commodity Flow Projections. The material presented in this section has its basis in projections which were prepared for the entire Ohio River System, by Robert R. Nathan Associates, Inc. The study results are contained in a report titled "Projections of Demand for Waterborne Transportation, Ohio River Basin 1980, 1990, 2000, 2020, 2040". The Nathan Study investigated and analyzed the production, transportation and demand characteristics of each of the Ohio River Navigation Systems major commodities. Historical production and consumption rates were determined by data received from numerous Federal, state and local governmental agencies, educational and research institutions, industrial associations and individual commodity producers. The future production and consumption estimates were determined considering regional and national economic, as well as legislative, outlooks. The factors influencing historical changes and/or shifts in the choice of mode were also identified and interpreted. The developed projections were based on traffic movements which occurred in 1976. Since that time there have been some changes in the origins and destinations of several commodities. A shift in the use of upper

TABLE 2

MONONGAHELA RIVER NAVIGTION SYSTEM
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

COMMERCIAL HISTORY
LOCK 7 AND LOCK 8,
MONONGAHELA RIVER
(Millions of Tons)

Year	Lock 7	Lock 8
1962	6.4	4.4
1963	8.0	5.8
1964	9.4	7.4
1965	9.9	7.5
1966	8.7	6.6
1967	8.9	6.6
1968	8.2	6.0
1969	8.8	6.5
1970	10.3	8.2
1971	8.8	7.0
1972	10.0	8.1
1973	9.8	7.6
1974	9.3	7.3
1975	6.3	7.8
1976	8.4	7.1
1977	8.2	7.0
1978	8.6	5.9
1979	8.8	8.1
1980	8.5	7.5
1981	7.9	7.0
1982	10.5	8.9

SOURCE: Lockmasters Estimates (1962-75), Performance Monitoring System (PMS) (1975-82), U.S. Army Engineer District, Pittsburgh

Monongahela River coal for steel production to its usage in electrical energy production and exportation has occurred. To incorporate these and other more recent changes, an update was made of the Nathan work by the Pittsburgh District using information obtained from a private consultant. The original Nathan projections, along with the Nathan Adjusted projections for Locks 7 and 8 are shown in TABLE 3. A more detailed explanation of the methodology used for both projection studies is contained in APPENDIX A - PROBLEM IDENTIFICATION.

TABLE 3

MONONGAHELA RIVER NAVIGTION SYSTEM
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

ACTUAL AND PROJECTED WATERBORNE COMMERCE
LOCK 7 AND LOCK 8
(1976 - 2040)
(Millions of Tons)

	Lock 7			Lock 8		
Year	Actual [1/]	Nathan	Nathan Adjusted	Actual [1/]	Nathan	Nathan Adjusted
1976	8.4	-	-	7.1	-	-
1982	10.5	-	-	8.9	-	-
1990	-	11.6	14.3	-	9.3	11.7
2000	-	12.9	15.9	-	10.3	13.0
2020	-	13.9	17.5	-	11.1	14.3
2040	-	14.8	18.6	-	11.8	15.2

[1/] PMS

An examination of TABLE 3 shows tonnage figures for 1982 of 10,500,000 tons for Lock 7 and 8,900,000 tons for Lock 8. This increase occurred during a period when the United States and particularly the Monongahela River Basin Region were experiencing a recession. The increase of tonnage is projected to continue and possibly escalate to an even higher level as the recent recession ends and economic growth resumes. In light of the above condition, the Nathan Adjusted projections present the most accurate picture of the future traffic through Locks 7 and 8.

8. LOCKAGE CAPABILITIES

a. Capacity and Delay Study. Capacities for Locks 7 and 8 were calculated using the LOCALC[1] computer model for the existing condition, for structural alternatives, and for several nonstructural alternatives which involve changing current lock operating policies. Capacities for alternatives involving a single high lift replacement of both locks are taken to be the same as the capacities calculated for the Lock and Dam 7 replacement, since the single high lift replacement would be located on the same site as those plans being considered for a Lock and Dam 7 replacement.

Two of the nonstructural alternatives evaluated involved either a "Ready to Serve" policy or a "Switchboat" policy. Under ready-to-serve, all tows would be sized to pass as a single lockage. All lockages would be made only with barge units that were self-powered, either with Government supplied or industry supplied switchboats. Fleeting areas would be provided both upstream and downstream of the lock at a distance to avoid interference with lock operations.

Under a switchboat policy, switchboats would be used primarily at the exit end of the lock for moving unpowered cuts of multiple-cut lockages away from the lock to facilitate chamber turnback and to allow a speedy exit for the last (powered) cut.

Capacities under a switchboat policy were determined only for the existing condition and for the in-kind replacements of the two locks. Any other alternative would reduce the number of multiple-cut lockages to a point where the use of switchboats would not be beneficial.

(1) Capacity Study. Data use in the LOCALC model was based on historical PMS data for the period May 1978 through April 1979. For the 56' x 720', 84' x 600' and 84' x 720' structural alternatives, the PMS tow configurations were adjusted to reflect fleet changes predicted to occur with an increase in chamber size. The barge-commodity distribution was also adjusted for the alternatives with 84-foot wide chambers. Capacities were determined using three queuing disciplines — one up/one down; first in/first out (FIFO), and three up/three down. A detailed discussion of the appropriate information and methodology used in this analysis and the results can be found in APPENDIX A. The specific capacities for the existing locks and for potential replacement lock sizes are summarized in TABLE 4.

1/ An analytical approach for computing lock capacity developed by the Waterways Experiment Station; Technical Report H-78-25, December 1978.

(2) Delay Study. Monthly traffic levels and average delays for the two locks under study were developed for each month from January 1976 to July 1982. Months with unusual delays due to lock malfunctioning or weather problems were eliminated from the study. Use of monthly data was preferred to obtain seasonal variations which may show a wide range of traffic densities over a period of a year. Such information can provide a better data base upon which to develop a traffic vs delay relationship than would be available from annual data.

The monthly tonnage was annualized as traffic density and plotted against average delay per tow, in minutes. A best fit hyperbola was matched to the data using the least squares regression technique.

b. Fleet Modification Study. This study considered the effects on capacities at Locks 7 and 8 should the fleet change and all standard barges (26' x 175') were replaced with larger equipment. At the same time, a limitation of no more than two cuts per lockage was also used in the study.

The related effects on capacities were then evaluated for both the existing condition and proposed alternatives. From this type of study, it was possible to observe if such a drastic change in fleet equipment would affect the final choice of the best alternative.

9. SURFACE TRANSPORTATION

a. Waterways. The Monongahela River is a part of the Mississippi River and Tributaries Inland Waterways System. A nine-foot navigation channel is maintained from the mouth of the Monongahela River at the "Point" in Pittsburgh, PA to Fairmont, WV. Nine lock and dam structures presently are being operated on the river to maintain the channel depth. The lower river serves major steel producers while one of the largest coal fields in the nation is located in the middle and upper sections.

The river has a high concentration of docks along its banks, with the density approaching more than one dock per mile in the lower reaches. The active commercial river terminals and docking facilities, which numbered 144 in 1982, are for the most part single-purpose and single user facilities.

Commercial tows navigating the river are generally arranged to facilitate a single lockage through the 84' x 720' and 56' x 720' lock chambers or a double lockage through the smaller 56' x 360' structures.

TABLE 4

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY
CAPACITIES OF EXISTING AND POTENTIAL
REPLACEMENT LOCK SIZE
(Millions of Tons)

Lock Size	Capacity
Lock 7	
56' x 360' (Existing)	18.90
56' x 360' (Replacement-in-kind)	19.90
56' x 720'	32.40
84' x 600'	28.20
84' x 720'	34.14
Lock 8	
56' x 360' (Existing)	18.30
56' x 360' (Replacement-in-kind)	18.69
56' x 720'	29.06
84' x 600'	25.84
84' x 720'	31.17

b. Railroads. The rail transportation network in the Monongahela River Basin includes four major Class I railroads (Conrail, Chessie, Norfolk and Western, and Pittsburgh and Lake Erie), two Class II railroads (Monongahela and Montour), and one Class I terminal and switching railroad (Union). The network formed by the Class I railroads extends well beyond the basin while the Class II railroads and Class I terminal railroad remains within the basin area. The extended networks make a direct connection to deep water ports on the Atlantic Coast, the Great Lakes and to the industrial centers and markets in the midwest and eastern portions of the United States.

c. Pipelines. A system of pipelines extends into and out of the Monongahela River basin with a number of terminal points situated within its boundaries. The pipeline network is comprised of four companies which transport gasoline, fuel oil and crude petroleum. The companies are: the ARCO Pipe Line Company, in the northern section of the basin, which transports various grades of gasoline; the Eureka Pipe Line Company, in the midwestern section of the basin, which transports crude oil; the Mobil Pipe Line Company, which traverses the northern section of the basin, and which transports refined petroleum products; and the Sun Pipe Line Company, which traverses the northern section of the basin, transporting gasoline, kerosene and fuel oil. Terminal points, situated throughout the network, normally have storage tanks and other facilities to receive and distribute the crude oil or refined products.

d. Highways. The highway system consists of a number of Interstate, United States and State Highways. This system moves both goods and people throughout the study area and the United States. Interstates 70 and 76 provide major east-west access along with United States Routes 30, 40, 48, 50 and 250. The major north-south access is provided by Interstate 79, together with United States Routes 19, 33, 119 and 219. In addition, there are numerous state highways interconnecting with all of these routes.

e. Conveyors. There is a very small number of conveyors located within the primary study area. In all instances these conveyors are used as an intermediary transport mode for coal from the mine to the river for transfer to barge or rail for subsequent delivery.

10. PROBLEM SUMMARY

The commercial traffic flow projections indicate that there is, and will continue to be, a demand for waterborne commercial service on the Monongahela River and specifically through the Locks and Dams 7 and 8 reach. These traffic demand studies are outlined in detail in APPENDIX A.

A comparison of the projected traffic levels and the estimated capacities of the two study locks indicates that the waterborne traffic demand could be accommodated well into the future, provided all elements of the existing waterway system continue to function in a safe, efficient and satisfactory manner. In addition, the examination of the highway and railroad networks indicated that they are adequate to continue to function with the waterway in either bringing materials to the river or delivering products to their final destination. Since the continuation of the existing system would accommodate projected traffic levels, no significant traffic induced problems are anticipated for fish and wildlife or recreation resources. The remainder of this report, therefore, is concerned with the problems associated with insuring that the existing navigation system on the Monongahela River (principally Locks and Dams 7 and 8) continues to function in an economic, effective and adequate manner.

SECTION III. FUTURE "WITHOUT" PROJECT CONDITION

1. GENERAL

Subparagraph 713.705 of the Water Resources Council's (WRC) guidance, "Procedures for Evaluation of National Economic Development (NED) Benefits and Costs in Water Resources Planning (Level C)," states in part that "... the Without Project Condition is ... the most likely condition expected to exist in the future in the absence of ... any changes in law or public policy ... (this) condition assumes that normal operation and maintenance will be performed on the waterway system over the period of analysis ...."

For the development of the "without" project condition several basic assumptions were made about the inland waterway navigation system. These were:

a. Normal operation and maintenance of the Navigation System would continue throughout the period of analysis.

b. Only existing waterway projects or those under construction are to be considered in place over the period of analysis.

c. All reasonable nonstructural measures for improving locking efficiencies (and hence capacity), that are within the authorities of the Corps, would be implemented when conditions warrant. Specifically, all locks on the Ohio River Navigation System would assume to be using the most efficient locking policy, with switchboats being used at the Winfield Locks on the Kanawha River and at the Gallipolis Locks on the Ohio River at about 1990 (the feasibility of using switchboats at these two projects has been verified by a comparison of anticipated benefits and costs).

d. Waterway user taxes would continue in the form of the towboat fuel tax prescribed by Title II of P.L. 95-502, the Inland Waterway Revenue Act of 1978. The tax began at four cents per gallon and will increase, in increments, until it reaches ten cents per gallon in 1985.

e. Alternative surface transportation systems are assumed to have sufficient capacity to move the waterway traffic at current rates over the period of analysis.

The inclusion of switchboats at Locks 7 and 8 as part of the most probable "without" project condition was also considered but discarded after studies showed they would not improve the locking capacities of either project. The river conditions, river traffic, location of each project in relation to each other and to adjacent structures, and the unique operational advantages of each existing project, when combined, offer little opportunity to decrease locking times sufficiently to justify the added cost of switchboats.

In developing the "without" project condition, consideration was first given to continuing the current mode of operation and maintenance and making major repairs when necessary. However, from the rather extensive condition analyses (APPENDIX F) accomplished during this study, it was concluded that the most likely result of such an approach would be an unanticipated failure of a major project component. Because such a failure would be "unscheduled," the cost, timing, and duration of the resulting closure of this portion of the Monongahela River Navigation System would result in costs to users that would be far greater than those for a similar but planned period of closure. Consequently, such a "without" project condition was considered to be contrary to the basic directive from Congress to maintain cost effective navigation through sound management of the inland waterway system, consistent with the overall public interest. Further, the benefit to waterway commerce currently being realized from the operation of Locks and Dams 7 and 8, as developed in APPENDIX J, BENEFIT EVALUATION, is approximately $54.5 million annually. With this national benefit accruing annually, the failure of this portion of the system would not be acceptable. System failure was, therefore, not adopted as the "without" project condition.

In view of the above, the "without" project condition would, therefore, be determined on the basic premise of maintaining traffic through Locks 7 and 8. In this regard, the previously noted condition studies at both projects produced a body of information that was used in evaluating a number of rehabilitation options as follows:

a. Perform normal maintenance, and make critical repairs while limiting lock closures to two weeks;

b. Perform more extensive rehabilitation, but limit closures to 90 days;

c. Perform major rehabilitation to provide for acceptable safety standards and design criteria, with the exception of such modern features as floating mooring bitts, line hooks, and a means of achieving an emergency lock closure; and

d. Perform major rehabilitation to provide for current design criteria, including all modern features.

The implementation of option a. would require that the lock chamber be dewatered to undertake certain critical repairs below the waterline (i.e. to gate sills, embedded valve and gate sills, etc.). With the critical stability problems that exist, such dewatering could only be undertaken with cofferdams and extensive internal bracing in place. This preparatory work would in and of itself, require a lock closure that would exceed the two week limit. Therefore, option a. is not possible.

Option b. was next examined to determine if it was possible to accomplish a meaningful amount of work, while holding the lock closure time to 90 days. Discussions with representatives of industry dependent on this portion of

the Monongahela River, and an evaluation of potential costs that would be incurred during any closure period revealed that the maximum amount of time the locks could be closed without major disruption to industry and high economic costs would be on the order of 90 days. Costs for closure times in excess of this time period would very quickly escalate to an exceedingly high level.

Detailed evaluations of the time required to accomplish the work necessary to stabilize the lock walls and sills to facilitate future dewatering, and perform the first phase of the rehabilitation work, indicated that a minimum of 5-1/2 months of closure would be required. This period would exceed the acceptable 90-day closure period, and, therefore, the option is not viable.

The remaining two options differ only in that one includes modern features and the other does not. These important "modern features" are discussed in detail in the following.

Line Hooks and Floating Mooring Bitts: The Director of Civil Works (OCE), in his letter of 19 March 1982, reaffirmed his support for the policy of "...eliminating the practice of Government personnel handling lines from transiting vessels." He continued by noting that "...the vessel operator shall provide for the safe movement, restraint, and mooring of his vessel while in or on the approaches, cells, walls, chambers and any other Federal appurtenances...." To be able to accomplish this, however, the structures must have readily accessible mooring facilities that can be reached at varying pool levels. At both Locks and Dams 7 and 8, the provision of floating mooring bitts would provide this accessibility. Floating mooring bitts are also used to avoid the necessity of changing lines while passing through the locks. ETL 1110-2-247, Lock Wall Accessories, 31 December 1979 provides "design guidance and layout recommendations for floating mooring bitts, check posts, line hooks, ...for new navigation locks and navigation locks that are to undergo rehabilitation" (underlining added). Such operational features should, therefore, be a part of any rehabilitation plan intended to last an extended period of time. In addition, a major portion of the total economic cost of rehabilitation relates to the length of time that the lock chamber must remain closed to all river traffic. After examining the work requirements for the installation of floating mooring bitts and line hooks, it was determined that no additional closure time would be necessary for their installation. Therefore, in view of the most recent design guidance, the relatively small additional costs for their installation, the unaffecting of the lock closure time and the overall safety aspects, it was concluded that floating mooring bitts should be a part of any rehabilitation plan.

Emergency Lock Closure: Considerable concern has been expressed in recent years about the severe economic and environmental costs associated with the sudden loss of pool. Water intakes cannot function, electric generating facilities must shutdown, and riverbank failure occurs causing failure of highways, railways, sewers, and any other structures located near the river. In addition, floating plant is often grounded and severely damaged and the flow of commerce on the inland navigation system is disrupted.

Locks 7 and 8 are particularly susceptible to the loss of pool due to an accidental ramming of the miter gates by tows entering the chamber. The basic problem is related to the limited depth of water over the lower sill (10 feet) and in the lock chamber. The difficulties this condition causes users of the lock is well documented in technical literature. Such an accident has occurred at Lock 8. An upbound tow struck both upper gates knocking them off the pintles resulting in the loss of pool. Accordingly, it is believed that emergency closure facilities should be provided for bulkheading the chamber upstream of the upper gates. Such a structure would furnish a quick closure dam in case of failure of the lock gates. A secondary benefit of such a feature is that it would facilitate normal maintenance requiring a dewatered lock chamber.

Therefore, the above analysis leads to the conclusion that the most viable option available for rehabilitating the existing locks is option d. This option, therefore, represents the "Without-Project" condition. Additional details of the evaluation, which lead to the conclusion of option d as the "Without-Project" condition, are contained in the SUPPLEMENT to the MAIN REPORT.

One additional aspect of the existing problems at Locks and Dams 7 and 8 received a considerable amount of consideration in the development of viable rehabilitation plans. It concerns the specific timing of the rehabilitation actions, or how much longer the existing facilities could continue to function before a failure would occur. While it is not possible to accurately predict a specific time for failure, the age and deteriorated condition of Locks 7 and 8 suggest a very serious situation. With concrete components weakened by time, wear, chemical reaction, and high initial internal stresses, and mechanical and electrical systems in need of renewal, it is obvious that the locks are nearing the end of their service life. There are numerous project features that are safety hazards and are incapable of fulfilling current design and functional requirements.

As indicated by the foregoing "without" project discussion and the condition studies of APPENDIX K, even with extraordinary maintenance efforts, replacement or major rehabilitation actions must be initiated in the near future. The earliest completion date, under the most optimistic schedule, for major construction activities at Locks 7 and 8 can be no earlier than about 1990. Accordingly, this date has been selected as the in-service date for the rehabilitation plan.

2. REHABILITATION

a. Lock and Dam 7. The plan of rehabilitation for Lock and Dam 7, as detailed in APPENDIX B, would provide the existing facility with the modern operational features necessary to insure a safe and efficient locking capability for the period of analysis, 50 years, using current safety, design and operational standards and criteria.

The major work features of such a rehabilitation plan would consist of the following:

- Resurfacing and refacing of all lock walls, including the installation of armor on those vertical wall faces subject to severe barge impact. This work is required to protect the remaining sound interior concrete (by removing deteriorated surface concrete and sealing with new concrete); to eliminate the sinking hazard to barges and boats that would "hang up", during lock filling operations, on the eroded, irregular wall surfaces; to eliminate the safety hazards to personnel both on the walls and on tows and other vessels; and to return the wall section to their design configuration as part of the approach toward obtaining compliance with stability criteria.

- Repairing of undercut areas beneath the lock walls. This work is necessary to assume adequate foundation conditions for the repaired existing walls. To be accomplished in the "dry", these corrective efforts would also contribute toward compliance with stability criteria.

- Construction of upper guide wall approach cells. This feature is required to better assist approaching tows entering the lock, particularly during high river flows. These cells would be of increasing importance with the current trend toward more larger tows on the upper Monongahela River.

- Stabilizing lock wall monoliths. This necessary work would assure the safe, continued availability of Lock 7 to serve waterway transportation in this reach of the river.

- Replacing lock gates, lock gate operating equipment, lock gate anchorages, lock gate miter sills and the lower lock gate guard sill. The lock gates and related lock gate appurtenances are critical features of a navigation installation. Constantly in use, subject to abuse and difficult to maintain and repair because of their essential role, the use of the existing items has been stretched beyond their safe and effective limits. Consequently, their replacement and/or rebuilding are required for the assured and continued safe operation and availability of Lock 7.

- Installing floating mooring bitts. This work is necessary to assure safe and cost efficient locking operations for personnel of both the lock and the transiting vessels, and would be accomplished in accordance with standards for new lock construction and major rehabilitation.

- Providing an emergency lock closure capability. This feature is required to assure safe and continued locking operations, prevent loss of pool and would be in accordance with standards for new lock construction and major rehabilitation.

- Replacing culvert valves and culvert valve operating machinery. This work is necessary because with the constant use and essential role in a navigation installation, the valves, framework and machinery have become worn and weakened. Their replacement is required to assure continued operation and availability of Lock 7.

- Replacing mechanical and electrical system components. This work is required because of original components being old and deteriorated and are continually prone to failures causing lockage delays.

- Upgrading power and lighting systems. This necessary feature of work is needed to increase the safety of locking operations and assure the continued operability of Lock 7.

- Repairing undercut areas beneath the existing dam and providing erosion protection downstream. Failure of the existing fixed crest dam and subsequent lengthy loss of pool would be critical to waterway users. The repair of the undercut areas of the dam and scour-proofing downstream of the existing apron would assure continual availability of Pool 7.

To accomplish all of the work items required under this rehabilitation plan would require a construction schedule of approximately three years. Of significance, however, is that since Lock 7 is a single chambered structure, the lock would be closed to all traffic for a continuous 10-month period.

Details of the cost of rehabilitating Lock and Dam 7, and the construction and close down schedules are contained in APPENDIX B, STRUCTURAL CONDITION - REHABILITATION.

b. Lock and Dam 8. As with Lock and Dam 7, this plan of rehabilitation would provide the existing lock and dam with the modern operational features necessary to insure a safe and efficient locking capability for the period of analysis using current safety, design, and operational standards and criteria.

The major work features of such a rehabilitation plan would consist of the following:

- Resurfacing and refacing of all lock walls, including the installation of armor on those vertical wall faces subject to severe barge impact. This work is necessary for the protection of the sound interior concrete (deteriorated surface concrete would be removed and replaced with new concrete); for the elimination of a sinking hazard to barges and boats during lock filling operations (they could "hang up" on the eroded, irregular wall surfaces); to eliminate the safety hazards to personnel both on the walls and on tows and other vessels; and to return the wall sections to their design configuration as part of the approach toward obtaining compliance with stability criteria.

- Repairing of undercut areas beneath the lock walls. This feature becomes necessary to assure adequate foundation conditions for the repaired existing walls. This work would be accomplished in the "dry" and would contribute toward compliance with stability criteria.

- Stabilizing lock wall monoliths. This necessary work would assure a continued available and safe Lock 8 for the service of waterway transportation in this reach of the river.

- Replacing lock gates, lock gate operating equipment, and lock gate anchorages. The constantly used lock gates and related lock gate appurtenances are critical features of a navigation installation. They are subject to abuse and difficult to maintain and repair because of this constant usage. The use of the existing items has been stretched beyond their safe and effective limits. Consequently, to assure a continued safe operation and the availability of Lock 8, their replacement and/or rebuilding are necessary.

- Installing floating mooring bitts. This work is necessary to assure a cost efficient and safe locking operation for personnel of both the lock and the transiting vessels. This installation would be accomplished in accordance with standards for new lock construction and major rehabilitation.

- Providing an emergency lock closure capability. This feature is required to assure safe and continued locking operations and would be in accordance with standards for new lock construction and major rehabilitation.

- Replacing culvert valves and culvert valve operating machinery. To assure operation and continued availability of the lock to the waterway users, this equipment must be replaced. The constant use of this equipment has worn and weakened the valves, framework and machinery.

- Replacing mechanical and electrical system components. This work is required because the original components are old and deteriorated and are continually prone to failures causing lockage delays.

- Upgrading power and lighting systems. This necessary feature of work is needed to increase the safety of locking operations and assure the continued operation of Lock 8.

- Repairing cracks around service bridge seats on the existing dam and on the downstream face of the gate sills of the dam, and repairing the scour areas below the fixed weir and providing scour protection below the dam. This work is required to assure the continued safe operation of the gated dam and to assure adequate foundation conditions.

- Replacing the dam abutment. This work is necessary to correct an unsafe condition that could lead to failure; and would return the abutment section to compliance with stability criteria.

A construction schedule of approximately two years would be necessary to accomplish all the work items required to rehabilitate Lock 8. Of significance, however, is that since Lock 8 is a single chambered structure, the lock would be closed to all traffic for a continuous 10-month period.

Details of the cost of rehabilitating Lock and Dam 8, and the construction and close down schedules are contained in APPENDIX B, STRUCTURAL CONDITION - REHABILITATION.

c. Risk and Uncertainty. A certain amount of risk and uncertainty is associated with any type of rehabilitation work. Such risk is even more likely and greater when the structure is as old as Lock and Dam 7 or Lock and Dam 8, and constructed to standards since superseded. These risks relate to several considerations:

(1) Original design and construction standards;

(2) Available records of "as-built" conditions and quality control;

(3) Effects of wear and tear over the life of the structure; and

(4) Records of maintenance and upkeep.

The District's experience with these considerations at other projects which have been rehabilitated supports the conclusion that these risks are real.

As an example of the potential risk, consider that the failure of a lock wall monolith during rehabilitation would have a catastrophic impact on the project, causing drastic increases in both cost and the time of performance for the rehabilitation work. This would also extend lock closure, adding greatly to economic losses for river users.

Risk, therefore, particularly with rehabilitation, is real and varied, and not easily or economically avoided. The rehabilitation plan just described substantially reduces such risk during and after construction, to an acceptable level, both in relation to foundations, construction procedures, and in the integrity of the structures themselves. However, in further recognition of the significant risk potential, a contingency factor of 35% is used in the rehabilitation cost estimate. It should also be noted that it has been assumed that the higher cost contingency factor will accommodate the wide array of possible unknowns associated with rehabilitation, within the time frames previously noted; i.e., no contingency factor has been applied to the estimated closure periods.

d. Benefit-Cost Evaluation of Rehabilitation. The benefit for the continuation of navigation service through Locks 7 and 8 on the Monongahela River is equal to $54.5 million (October 1983 Cost Level), using an 8-1/8 percent interest rate over a 50-year project. This value was derived by an extensive navigation system study which is explained in detail in APPENDIX J, BENEFIT EVALUATION.

The continuation of navigation service would, as a minimum, require the major rehabilitation of both Lock and Dam 7 and Lock and Dam 8, as described previously in this section. The estimated first cost is $83,355,000 for an average annual cost of $7,900,000 (as detailed in TABLE 6 of APPENDIX H).

e. Industry Cost Resulting from Extended Closure. The rehabilitation required at Lock and Dam 7 and Lock and Dam 8, as described in previous paragraphs, would require the concurrent closure of both facilities for a period of 10 months. Such a complete closure of the Monongahela River at this location and for such a duration would have significant regional and national economic impacts, and is an appropriate element in the NED accounting process. For the purpose of this analysis, the cost of closure induced by rehabilitation will be categorized as a benefit for the replacement alternatives under the heading of "alleviated cost of closure." The conceptual basis for this presentation is outlined in APPENDIX H, PLAN FORMULATION AND EVALUATION, under the section entitled, Economic Impacts of Closure.

The closure of the two locks could affect all waterway users, but coal industries located in Fayette, Greene, Monongalia and Marion Counties would undergo the largest industrial impact. These coal shippers moved approximately nine million tons of coal through the locks in 1980 (88 percent of the total tonnage through the locks). The primary use was for power generation, but also included coal for the steel industry and for export. Along with the coal that traverses Locks 7 and 8, there are also petroleum products and aggregate shipments which would be affected.

Those who rely on the waterway system could adjust their operations to accommodate a closure in several ways: (1) the shippers and receivers could continue to move the affected commodities during the lock closure using least costly modes, routes and/or alternative sources of supply; (2) coal users, particularly electric power plants, could stockpile coal for use during the 10-month shutdown; or (3) power plants could shut down for the closure duration and import their needed power from plants in the midwest or along the east coast.

Alternatives two and three were found not to be economically feasible. The third alternative (importation of power) was found to have an incremental cost of $182 million, substantially higher than the cost associated with transporting the coal by another mode or route. Alternative two also proved infeasible, since the cost associated with the stockpiling of coal at the power plants surpassed the cost of shipping or obtaining the coal by another system in order to continue operation. For a more detailed analysis of these alternatives see APPENDIX H, PLAN FORMULATION AND EVALUATION.

From detailed information obtained in interviews with the potentially affected waterway users, it is possible to estimate the NED impact costs resulting from the closure disruption. This information was used to arrive at the total cost associated with the "without" project condition and was derived from several sources: replacement costs of coal not able to move because of closure, installation costs for transloading facilities, highway rehabilitation, and the costs associated with shipping by alternative modes or routes. The total costs associated with the above categories for a 10-month closure amount to $73,211,000.

f. Multiple-Year Shutdown for Rehabilitation. Consideration was also given to performing the required rehabilitation work with multiple-year shutdowns of the lock chamber. The potential of accomplishing the

proposed work in three, four or five consecutive years using shorter term shutdown periods was first evaluated. It was determined that there are only two major sequences of work which would logically follow and each would be continuous. Therefore, the most reasonable alternative to a single, 10-month shutdown would be a two-year plan. During the first shutdown, all efforts would be directed toward completing those features that would facilitate dewatering the lock during subsequent closures. These initial activities would consist of completing the new emergency and maintenance closure systems, repairing the undercut area of the river wall, and placing roller compacted concrete in the lock chamber floor. This work would be accomplished in about 5-1/2 months, with the construction of the emergency closure system controlling the time. The remaining work, to be accomplished during the second year shutdown, would include all refacing of the lock chamber walls, and the replacement of the lock gates and appurtenances. This work would require about 6-1/2 months, with the removal, reinforcing, and partial rebuilding of the miter gate monoliths controlling the time. This two-year shutdown plan would, therefore, close the river to navigation for a total of 12 months, compared to 10 months for a one-year shutdown. More details of additional multiple year shutdown schemes are discussed in the SUPPLEMENT to the MAIN REPORT.

g. Economic Impacts of Multiple-Year Shutdown. The economic cost associated with the multi-year shutdown was also evaluated and found to be higher than the single, 10-month closure. The higher cost is associated with the higher transportation costs which would be incurred for a 12-month, rather than a 10-month period. Also, the charges for keeping the transloading facilities operating for two years instead of the original 10-month period would be higher. Another cost would be incurred in switching operating procedures from the waterway to an overland route, back to the waterway, then overland again, and finally back to the waterway. Due to these factors the multi-year closure would, under the most favorable circumstances, remain higher than the cost associated with a single, 10-month closure.

SECTION IV. FORMULATION OF PRELIMINARY PLANS

1. ANALYSIS OF PLANS CONSIDERED IN PRELIMINARY PLANNING

a. General. The feasibility study of the replacement of Locks and Dams 7 and 8 was accomplished through an iterative process. It began with the identification and initial preliminary evaluation of all reasonably possible plans and continued to the selection of a final array of plans from which the recommended plan evolved. This process consisted of plan formulation and the assessment of each study plan in terms of its beneficial and negative effects, i.e., plan evaluation.

An examination was made of a number of alternatives that would alleviate the problems at these two projects, while continuing the availability of the structures for commercial traffic. The alternatives, addressed in detail in APPENDIX H - PLAN FORMULATION, varied from relatively low cost nonstructural measures to more costly replacements.

b. Nonstructural Measures.

(1) Change in Locking Policy (Ready-to-Serve). Under this policy all lockages would be required to be single and self-powered. Fleeting areas, away from the lock chambers, would be provided in both the upstream and downstream pools and additional towboats provided to assume that each lockage operation would accommodate a group of barges and a towboat.

The capacity and delay study addressed in APPENDIX A - PROBLEM IDENTIFICATION, details this ready-to-serve alternative. The results indicated that with such a policy, the delays, which would be encountered by commercial tows when the locks approached 70 percent of physical capacity, could be reduced by 35 minutes per tow.

(2) Use of Switchboats. This measure would require the utilization of switchboats at both ends of each lock to remove the unpowered cuts of multiple cut tows locking through. The switchboat would then transport the barges to a point some distance from the lock site so as to avoid congestion and to facilitate the speedy chambering of the remainder of the tow which would be self-powered.

This measure is also addressed in detail in APPENDIX A. The results indicate a savings of only 25 minutes per tow, at 70 percent of physical capacity, with the implementation of this measure.

(3) Other Considerations. The scheduling of tow arrivals and the implementation of congestion fees were also considered as possible nonstructural measures that could increase the efficiency of the existing structures to process navigation traffic.

Tow arrival scheduling would be a solution that would require a great deal of imposition and costly coordination with the towing industry. Implementation, however, would be the most readily accomplishable nonstructural alternative, with the proper coordination, but a major problem would be the arrival timing of waterway movements over long distances.

The other possibility, implementation of congestion fees, would induce the marginal waterway user to leave the system as traffic congestion increased and, therefore, in turn reduce the level of demand for the waterway service and reduce the delay experienced by the remaining users. An analysis of congestion fee implementation is detailed in SECTION VII, APPENDIX J. The analysis resulted in the findings that the implementation of a congestion fee would result in an optimum traffic level at Lock and Dam 7 of 13.0 to 13.9 million tons annually (1990 to 2040 respectively) and 11.6 to 13.2 million tons annually at Lock and Dam 8 (also 1990 to 2040 respectively). This would reduce the traffic level by 1.2 million tons at Lock and Dam 7 and from 0.05 to 0.3 million tons at Lock and Dam 8. This reduced traffic demand would produce an incremental increase in system rate savings of $300,000 to $700,000 (1990 to 2040 respectively). Based on an 8-1/8 percent discount rate and October 1983 prices, this would produce an average annual benefit of $400,000. Even if it is assumed that there would be no cost for implementing this congestion fee, the net benefits ($400,000) would be far less than other alternative plans.

(4) Conclusions. The present level of traffic at Locks 7 and 8 does not present any significant congestion problems and associated delays. However, and most importantly, even though increased delays are projected to occur as early as 1990, none of the nonstructural approaches would solve the more pressing problem of the degraded overall condition and questionable structural integrity of both locks.

c. Replacement.

(1) Site Location. Possible replacement site opportunities were investigated in the middle Monongahela River area from Maxwell Locks and Dam at r.m. 61.2 to Lock and Dam 8 at r.m. 90.8. Numerous criteria were used in selecting a site for possible replacement of Locks and Dams 7 and/or 8. The criteria included a reasonably straight reach of river to provide an adequate clear line of sight approach of approximately one-half mile both upstream and downstream, avoidance of obstructive structures such as docks, launching ramps, bridges, etc. in the lock approaches, expanse of river to minimize potential flooding problems and availability of vehicular access to the lock site.

Four sites appeared to offer an opportunity for the development of reasonable replacement of Lock and Dam 7. The locations, shown on PLATE 3, are at r.m. 82.2, r.m. 83.6, r.m. 85.0 (the existing location of Lock and Dam 7), and r.m. 86.8. Also shown on PLATE 3 were three other locations, r.m. 88.0, r.m. 90.4 and r.m. 90.8 (existing Lock and Dam 8), selected as possible replacement sites for Lock and Dam 8.

In addition to the seven sites mentioned above for the replacement of Lock and Dam 7 and Lock and Dam 8, four of the sites (r.m. 82.2, r.m. 83.6, r.m. 86.8 and r.m. 88.0), were also chosen as possibilities for a single

project to replace both Lock and Dam 7 and Lock and Dam 8. The following paragraphs detail the physical description of each site and replacement plan.

(a) River Mile 82.2 Site. This location provides long straight approaches for both the right and left bank lock location in both the upstream and downstream directions, but each contains a coal loading dock on the downstream end. The U.S. Steel Corporation, Cumberland Mine dock is located on the left bank at r.m. 81.5 and the Gallatin Fuel Company, Inc. dock at r.m. 81.8 is located on the right bank. Another dock, owned by the L&J Equipment Company, is located on the left bank at r.m. 82.2 and regardless of the replacement selected at this site would require removal and relocation. Vehicular access to the lock area on the right bank would be excellent using State Route 166. The left bank would require the construction of a long and costly access road. The left bank terrain would also require extensive excavation for a new lock structure placement. The wide expanse of river would provide sufficient length of dam to pass high stream flows and minimize upstream backwater flooding.

(b) River Mile 83.6 Site. The right bank at this site location would provide the best unobstructed approach situation both upstream and downstream. The left bank location, however, has a shorter line of sight upstream, for which the cross approach could be very hazardous during periods of high flow, and a launching ramp in the upstream approach. Although the line of sight in the downstream approach is more than adequate, a coal loading dock, owned by the Duquesne Light Company, does interfere. The left bank does offer the most advantages for site selection when it comes to terrain, vehicular access and required relocations. The steeper terrain on the right bank would involve extensive excavation for a new lock structure and the relocation of the Monongahela Railroad. Vehicular access would be more difficult to accomplish and costly to construct. Some interference of traffic could occur because of the relatively narrow river width at this location during the construction of a new lock and dam.

(c) River Mile 85.0 Site. Three possible replacement site locations were considered at this existing Lock and Dam 7 location. They are a new lock landward of the existing lock, locating a new lock riverward of the existing lock and finally, constructing a new lock on the right (opposite) bank of the river.

The landward location would involve numerous construction difficulties and high construction costs. A bank excavation in excess of 200 feet vertically and requiring drilling and blasting would be needed. The existing lock chamber land wall would require anchoring during the new lock construction and would present a constant potential hazard to river traffic during such construction. The new approaches in both directions would be somewhat less than desirable. Vehicular access, that exists presently, is just barely acceptable and would require upgrading with a new roadway

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bridge. Once the old lock chamber is removed, a new fixed weir would be constructed in its place. The original fixed crest dam would be retained, but because of the existing scour conditions would require extensive repairs and additional measures to prevent recurrence.

The riverward location would necessitate the stabilization of the existing river wall of the lock chamber during construction. The approach conditions in both the upstream and downstream directions would be somewhat less than desirable. As with the landward location of a new lock, vehicular access to the new riverward lock would require upgrading with a new roadway bridge. The location of a new lock riverward of the existing lock would reduce the effective length of the fixed crest dam to 450 feet. Dredging of the river would be required to reduce the velocities to within an acceptable range for waterway users. The shortened existing dam would increase the potential for flood damage during periods of high flow and because of the existing scour conditions would require extensive repairs and additional measures to prevent recurrence.

The opposite (right) bank location would contain extremely difficult navigation restrictions in the lower approach. A sharp left bend in the river would cause great difficulty for downbound tows exiting the lock. The mouth of Georges Creek would cause considerable hinderance to navigation during periods of high flow and would create a continual shoal maintenance problem. The upstream approach would require extensive excavation of National Park Service land, part of which is a proposed development area for the Albert Gallatin National Historical Site and would become susceptible to siltation buildup creating an annual maintenance dredging problem. If the downstream area were excavated to provide necessary clearance for tows exiting, then the Monongahela Railroad and State Route 166 would need to be relocated. Although vehicular access could easily be attained because of the proximity of Route 166, a railroad grade crossing would have to be installed. As with the two previous lock locations at r.m. 85.0, the existing fixed crest dam would require extensive work to repair and prevent any recurrence of the scouring under the dam that presently exists.

(d) River Mile 86.8 Site. The left bank location contains a line of sight in the upstream approach that is more than adequate and is twice that attainable on the right bank. The major drawback to the upstream approach on the left bank is Dunkard Creek which would interfere with the movement of downbound tows approaching the lock and could create a hazardous situation during high flows. The downstream approach would provide a sight distance of over a mile for the left bank and under one-half mile on the right bank. The left bank location would require extensive excavation because the lock would be built on land instead of within a cofferdam. However, this would minimize disruption to existing navigation traffic during construction. Vehicular access to the lock area on the left bank would be excellent with the proximity of a state highway. Either bank location of the lock would require dredging of the river from existing Lock

and Dam 7 to provide a nine-foot channel depth through the area because the pool would be lowered 15 feet. The Shannopin Mining Company coal loading dock, presently located on the left bank at the new lock location, would require removal and relocation.

(e) River Mile 88.0 Site. The left bank presents numerous factors which make it virtually unrealistic for placement of a lock. The lock would have to be located on the outside of a curve and would necessitate considerable excavation in the upper approach and would practically eliminate the community of Dilliner. Extensive highway and railroad relocations would also be required. The right bank would require substantial excavation since the lock would be built in the dry and not within a normally needed cofferdam. This construction plan would minimize disruption to existing navigation traffic. The sight distance in the upstream approach would be less than one-half mile but would be greatly improved with a minimal amount of shoreline excavation. The downstream sight distance is adequate but would require the removal and relocation of a Gallatin Fuels, Inc. coal loading dock which is in its approach. Vehicular access to the lock site would be easily accomplished.

(f) River Mile 90.4 Site. Both sides of the river exhibit many negative features for the location of a lock chamber. The elimination of the majority of the L. J. Houze Glass Company plant and a substantial portion of the community of Point Marion because extensive excavation would be required with the placement of the lock on the right bank. The left bank would require an extensive and costly relocation of a state highway. The left bank location would also require some displacement of the L. J. Houze Glass Company plant because of the construction of the abutment for the dam and related downstream excavation to achieve desired flow conditions in this narrow portion of the river. Although the upstream sight distance would be excellent on both banks, once existing Lock and Dam 8 was removed, the maneuvering of river traffic during construction would be near impossible.

(g) River Mile 90.8 Site. The right bank location for a new lock at this site demonstrates a number of unacceptable features. The location of a lock on this bank would require a costly relocation of the Chessie Railroad. The L. J. Houze Glass Company, in the downstream approach area, would be eliminated or relocated because of the extensive excavation required. The left bank location, landward of existing Lock 8, would permit construction in the dry and would not interfere with the existing river traffic. The upstream approach would present an unobstructed line of sight of over one mile. The downstream approach, however, because of the adjacent terrain, a highway and railroad, would require an unusual treatment to accommodate traffic during high river flows. Of most significance would be the addition of a pivoting pier to assist exiting tows in aligning themselves with the downstream river channel.

(2) Site Evaluation. From the previous discussions the following sites remained for further consideration during the first evaluation iteration. The right bank at r.m. 82.2, the left bank at r.m. 83.6 and r.m. 86.8 and riverward of the existing lock at r.m. 85.0 for the replacement of Lock and Dam 7. The right bank at r.m. 88.0 and landward of the existing lock at r.m. 90.8 for the replacement of Lock and Dam 8. The right bank site at r.m. 82.2 and the left bank site at r.m. 83.6 for a single project to replace both Lock and Dam 7 and Lock and Dam 8.

SECTION V. REPLACEMENT ALTERNATIVES

1. GENERAL

Among the sites previously presented, four locations were considered further as possible replacement sites for Lock and Dam 7. They were r.m. 82.2 right bank, r.m. 83.6 left bank, r.m. 85.0 riverward of the existing lock and left bank at r.m. 86.8. Two sites, on the right bank at r.m. 88.0 and at r.m. 90.8, landward of the existing lock, were considered for possible replacement of Lock and Dam 8. Consideration of the possible replacement of both Lock and Dam 7 and Lock and Dam 8 with a single structure was investigated at r.m. 82.2, r.m. 83.6 and r.m. 86.8.

The following describes specific replacement alternatives considered during this second iteration of the plan formulation process. The scope of this iteration also included the estimated costs of all plan elements, to identify candidate plans for final plan selection. TABLE 5 presents the first cost of each major item for each plan considered during this iteration.

2. DESCRIPTION OF ALTERNATIVES

a. Alternative No. 1

R.M. 82.2 right bank - Replace Lock and Dam 7.

Facilities - New 56' x 360' lock chamber with a 576' fixed crest dam; providing a lift of 15'.

Extend existing Pool 7 downstream 2.8 miles.

Remove existing Lock and Dam 7.

Approach Conditions - Expected to be acceptable under all flows; velocities at maximum navigable stage are estimated to be less than 6 ft/sec.

Relocations - New steel girder highway bridge over Jacobs Creek; new steel liner plate culvert under the Monongahela Railroad at Jacobs Creek, and bank protection from r.m. 83.2 to r.m. 84.9; coal dock adjustment; new pump house and 850 feet of pipeline adjustment for New Geneva Water Company; and adjustment of 1,075 feet of sewer line for Greensboro.

Acquire approximately 43 acres, in fee for the new lock site; approximately 200 acres of standard flowage easements, and approximately 14 acres of bank protection construction easements. Additionally, the fixed crest dam 2.8 miles downriver from existing Dam 7, and the 15-foot pool raise would induce backwater flooding and additional flooding damages between r.m. 82.2 and existing Lock and Dam 7. An evaluation of this additional flooding indicates that the affected properties of 315 acres include

43 tracts with habitable structures. The current average annual damage in this 2.8-mile reach is estimated at $27,000. This represents damage to 22 structures with basement flooding only, nine with first floor flooding, and three structures that would experience flooding to the second floor. The remaining tracts with habitable structures experience flooding of the grounds only. Flood damage estimates have been based on 1973 field surveys, with values indexed to an October 1983 cost level, and include damage to structures and contents, damage to highways, utilities, grounds, ancillary buildings, and income and wage losses. After construction of a new fixed crest dam at r.m. 82.2, the average annual damages are projected to increase by approximately $40,000 to about $67,000. This increase would result in increased flooding to all previously identified habitable structures, as well as to additional real estate. No additional habitable structures would be affected by the induced backwater flooding. Since the increased flood damages would be directly related to the navigation project, it was determined, as a minimum, to compensate those affected by the increases. Accordingly, a variety of options were considered to address the induced flooding, as outlined in the following:

OPTION A: Account for the added flood damage (increase in average annual damage) in the economic evaluation and seek contingency authority to acquire additional flowage easements if needed (no estimated cost);

OPTION B: Include as a project cost, limited easements that would provide compensation for the added flood damage. This would be in the form of a lump sum payment equalling the present worth of the increase in average annual flood damages over the 50-year economic life of the new facility. This option is estimated to add approximately $600,000 to the project first cost;

OPTION C: Acquire modified flowage easements up to the new 100-year flood level that permit habitable structures to remain, providing the structures are suitable for floodproofing and further providing that an amicable agreement can be reached with the land owner. The floodproofing would include some or all of the following:

Foundation Extension
Sealing of Foundation and Basement Openings
Installation of Sump Pump Systems
Installation of Sewer Valves
Raising of Superstructure
Access and Utilities Adjustments

If the structure is not suitable for floodproofing and/or an amicable agreement cannot be reached with the land owner, a standard flowage easement will be acquired.

This approach would cost an estimated $1,800,000;

OPTION D: Acquire standard flowage easements on all properties below the new 100-year flood level. This option would involve a project cost estimated at $10,500,000;

OPTION E: Construct a gated dam in lieu of the fixed crest dam. This approach would increase the project first cost by an estimated $13,200,000 over the cost of the fixed crest dam.

Option A is not a viable solution since it does not specifically identify the means and the cost of the indexed flood damages. Option B would require that compensation be determined on the basis of possible future flood damages. Such an approach would be counter to current policy in th it is somewhat speculative and provides little or no input by the owners. It, therefore, is not considered an acceptable option. Options D and E a rational, logical approaches to the induced damage situation, but in this instance are not considered warranted in view of the projected limited increase in flood damages. Option C represents an equitable, reasonable, and implementable remedy to the instant problem. Although not cost effec tive, the solution is at an acceptable level of cost and is considered necessary. Therefore, the cost of this option has been added to the cost of all alternatives for this site that utilizes a fixed crest dam.

Estimated total project cost = $78,100,000.

TABLE 5

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
SUMMARY OF CONSTRUCTION COSTS
COMPLIMENTS OF ALTERNATIVE PLANS
56' x 360' LOCK SIZE
(Thousands of Dollars)
(October 1983 Cost Level)

Site Location (River Mile and Bank 1/)	Type of Dam	Lock	Dam	Channels and Canals	Buildings, Grounds, Utilities and Permanent Operating Equipment	Pool Preparation	Relocations	Lands and Damages	Other	Total 7/
Replacement for L/D 7:										
82.2 R	Fixed Crest	$47,000	$15,500	-	$ 900	$1,800	$5,000	$7,600	$ 300 8/	$78,100
83.6 L	Fixed Crest	49,500	15,600	$ 400	900	1,800	2,500	7,200	300 8/	78,200
85.0 L 2/	Fixed Crest 2/	54,900	22,900	7,100	1,300	-	-	-	-	86,200
86.8 L	Fixed Crest	48,200	17,000	15,200	900	1,800	200	3,800	-	87,100
Replacement for L/D 8:										
88.0 R	Gated	53,900	36,100 3/	-	1,100	4,800	200	9,700	-	101,800
90.8 L	Gated 6/	47,000 3/	3,000 4/	-	900	2,000	-	100	-	53,000
Single Replacement for L/D 7 and L/D 8:										
82.2 R	Gated	65,400	44,100	-	900	6,600	33,800	17,600	9,100 9/	177,500
83.6 L	Gated	67,600	44,100	-	900	6,600	30,900	12,800	9,100 9/	172,000
86.8 L	Gated	69,100	51,900	21,700	900	6,600	10,700	7,600	8,500 9/	177,000

1/ Right or Left indicates descending bank.
2/ New lock riverward of existing lock with a new 610' dam.
3/ Lock cost includes a fixed weir to replace the existing lock chamber.
4/ Detailed cost estimate for rehabilitation of existing dam and abutment replacement contained in APPENDIX B, STRUCTURAL CONDITION - REHABILITATION.
5/ Adjustments to the Lake Lynn Power Station are necessary due to an increase in the tailwater pool level of the Cheat River below the dam.
6/ Existing dam would be rehabilitated and retained.
7/ Does not include Engineering, Design, Supervision and Administration.
8/ Cultural Resource Investigation.
9/ Adjustments to the Lake Lynn Power Station (8,500) and Cultural Resource Investigation (600).

b. Alternative No. 2

R.M. 83.6 left bank - Replace Lock and Dam 7.

Facilities - New 56' x 360' lock chamber with a 576' fixed crest dam; providing a lift of 15'.

Extend existing Pool 7 downstream 1.4 miles.

Remove existing Lock and Dam 7.

Approach Conditions - Fairly good downstream, with velocities less than 6 ft/sec; and approximately six feet of streambed excavation over the entire length of the dam. Upstream, the possibility of a potentially hazardous situation exists for tows approaching during periods of high flows.

Relocations - Pier treatment of Monongahela Railroad bridge over Georges Creek and bank protection from r.m. 83.6 to r.m. 84.9; and adjustment of 1,075 feet of sewer line for Greensboro.

Acquire approximately 35 acres, with improvements in fee; approximately 184 acres of flowage easements, with improvements; and approximately 10 acres of bank protection easements. As in alternative No. 1, this alternative would induce backwater flooding and additional flooding damages in a pool raise reach between r.m. 83.6 and existing Lock and Dam 7. An evaluation of this additional flooding, affecting 310 acres, indicates that these properties would include, in addition to real estate and ancillary buildings, 31 habitable structures. As detailed in alternative No. 1 the option to acquire modified flowage easements up to the new 100-year flood level, but allowing habitable structures to remain by including flood-proofing measures or acquisition for such structures would also be selected in this alternative. The cost to accomplish these items ($1,630,000) has been added to the cost of this alternative.

Additional 600,000 cubic yards of common excavation required over Alternative No. 1.

Estimated total project cost = $78,200,000.

c. Alternative No. 3

R.M. 85.0 left bank (riverward of existing lock) - Replace Lock and Dam 7.

Facilities - New 56' x 360' lock chamber with a 610' fixed crest dam; providing a lift of 15'.

Remove existing Lock and Dam 7.

Approach Conditions - Fairly good downstream, provided seven feet of streambed is excavated over the entire length of the dam. Upstream, approach conditions are acceptable under all flow situations, provided the streambed is extensively dredged.

Acquire approximately three acres, with improvements in fee.

Additional $6,000,000 required to anchor the existing lock.

Estimated total project cost = $86,200,000.

d. Alternative No. 4

K.M. 86.8 left bank - Replace Lock and Dam 7.

Facilities - New 56' x 360' lock chamber with a 780' fixed crest dam; providing a lift of 15'.

Lower existing Pool 7 by 15' from r.m. 85.0 to r.m. 86.8.

Remove existing Lock and Dam 7.

Approach Conditions - Relatively poor, both upstream and downstream; cross currents during high flows make chamber entering and exiting difficult; and six feet of excavation is required downstream over the entire length of the dam.

Acquire approximately 62 acres, with improvements in fee.

Additional 1,800,000 cubic yards of common excavation required over Alternative No. 1.

No cofferdam required for construction of lock.

Additional 100,000 cubic yards of rock excavation required over Alternative No. 1.

Approximately 500,000 cubic yards of soil and rock dredging required throughout the lower pool area.

Estimated total project cost = $87,100,000.

e. Alternative No. 5

K.M. 88.0 right bank - Replace Lock and Dam 8.

Facilities - New 56' x 360' lock chamber with a 580' gated dam (five tainter gates and a 110' fixed crest weir); providing a lift of 19'.

Extend existing Pool 8, 2.8 miles downstream.

Remove existing Lock and Dam 8.

Approach Conditions - Reasonably good; however, the possibility exists for cross currents to create a potentially hazardous situation, particularly in the area of the downstream approach.

Acquire approximately 47 acres, with improvements in fee; and approximately 214 acres of flowage easements, also requiring improvements.

No cofferdam required for construction of lock.

Additional 2,200,000 cubic yards of common excavation required over Alternative No. 6.

Additional 70,000 cubic yards of concrete required over Alternative No. 6.

Estimated total project cost = $101,800,000.

f. Alternative No. 6

R.M. 90.8 left bank (landward of existing lock) - Replace Lock 8.

Facilities - New 56' x 360' lock chamber, rehabilitated gated dam and new abutment.

Remove existing Lock 8.

Approach Conditions - Acceptable upstream, under all flow conditions; however, the downstream approach requires the construction of a pivot pier and turning basin.

Acquire approximately 46 acres, with improvements in fee.

No cofferdam required for construction of lock.

Estimated total project cost = $53,000,000.

g. Alternative No. 7

R.M. 82.2 right bank - Replace Locks and Dams 7 and 8.

Facilities - New 56' x 360' lock chamber with a 576' gated dam (five tainter gates and a 106' fixed crest weir); providing a lift of 34'.

Extend existing Pool 8, 8.6 miles downstream.

Remove existing Locks and Dams 7 and 8.

Approach Conditions - Acceptable under all flow conditions; velocities at maximum navigable stage less than 6 ft/sec.

Relocations - New steel girder highway bridge over Jacobs Creek; two new bridges over Georges Creek; one new bridge over Dunkard Creek; one new bridge over the Monongahela Railroad; one new bridge over a Cheat River tributary and approximately 5.0 miles of highway adjustments; a new steel girder railroad bridge over Jacobs Creek, Georges Creek and the Monongahela River, including the adjustment of approximately 4.0 miles of railroad roadbed; adjustment of seven coal loading docks; new pump house, including 850 feet of pipeline adjustment for New Geneva Water Company; and adjustment of over 2,000 feet of sewer line in Greensboro and Point Marion.

Acquire approximately 43 acres, with improvements in fee; and approximately 601 acres of flowage easements, also requiring improvements.

Loss of power head and subsequent loss of revenue at Lake Lynn Power Station.

Estimated total project cost = $177,500,000.

h. Alternative No. 8

R.M. 83.6 left bank - Replace Locks and Dams 7 and 8.

Facilities - New 56' x 360' lock chamber with a 576' gated dam (five tainter gates and a 106' fixed crest weir); providing a lift of 34'.

Extend existing Pool 8, 7.2 miles downstream.

Remove existing Locks and Dams 7 and 8.

Approach Conditions - Fairly good downstream; velocities less than 6 ft/sec; and approximately six feet of streambed excavation over the entire length of the dam. Upstream, the possibility of a potentially hazardous situation exists for tows approaching during periods of high flows.

Relocations - New steel girder highway bridge over Dunkard Creek; two new bridges over Georges Creek; one new bridge over the Monongahela Railroad; one new birdge over a Cheat River tributary and approximately 4.0 miles of highway adjustments; three new steel girder railroad bridges over Jacobs Creek, Georges Creek and the Monongahela River, including the adjustment of approximately 4.0 miles of railroad roadbed; adjustment of six coal loading docks; and adjustment of over 2,000 feet of sewer line in Greensboro and Point Marion.

Acquire approximately 35 acres, with improvements in fee; and approximately 520 acres of flowage easements, also including improvements.

Additional 600,000 cubic yards of common excavation and 10,000 cubic yards of rock excavation required over Alternative No. 7.

Loss of power head and subsequent loss of revenue at Lake Lynn Power Station.

Estimated total project cost = $172,000,000.

i. Alternative No. 9

R.M. 86.8 left bank - Replace Locks and Dams 7 and 8.

Facilities - New 56' x 360' lock chamber with a 780' dam (five tainter gates and a 300' fixed crest weir); providing a lift of 34'.

Lower existing Pool 7 by 15' from r.m. 85.0 to r.m. 86.8; Extend existing Pool 8, 4.0 miles downstream.

Remove existing Locks and Dams 7 and 8.

Approach Conditions - Relatively poor, both upstream and downstream; cross currents during high flows make chamber entering and exiting difficult; and additional excavation required downstream of the new dam to reduce entrance velocities to an acceptable level.

Relocations - New steel girder highway bridge over Dunkard Creek; one new bridge over the Monongahela Railroad; one new bridge over a Cheat River tributary and approximately 3.0 miles of highway adjustments; adjustment of three coal loading docks; and adjustment of over 1,000 feet of sewer line in Point Marion.

Acquire approximately 62 acres, with improvements in fee; and approximately 340 acres of flowage easements, also requiring improvements.

Additional 1,900,000 cubic yards of common excavation and 150,000 cubic yards of rock excavation required over Alternative No. 7.

Approximately 600,000 cubic yards of soil and rock dredging required throughout the lower pool area.

No cofferdam required for construction of lock.

Loss of power head and subsequent loss of revenue at Lake Lynn Power Station.

Estimated total project cost = $177,000,000.

3. EVALUATION OF ALTERNATIVES

An evaluation of the construction cost of each candidate replacement alternative, shown previously in TABLE 5 and addressed in detail in APPENDIX I COST ANALYSIS, indicates that two sites appear to merit consideration for the replacement of Lock and Dam 7. Each site, r.m. 82.2 (Grays Landing) and r.m. 83.6 (Greensboro), is compared in TABLE 6.

TABLE 6
MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
SITE COMPARISON FOR THE REPLACEMENT OF
LOCK AND DAM 7

	R.M. 82.2 Right Bank	R.M. 83.6 Left Bank
Approach	Acceptable under all flows. Velocities at maximum navigable stage less than 6 feet per second.	Upstream approach could create problems for tows during high flows. Velocities in downstream approach would be less than 6 feet per second.
Relocations	One highway bridge; one steel liner plate culvert under the Monongahela R.R. and bank protection from r.m. 83.2 to r.m. 85.0; relocation of one coal loading dock and adjustment of another; new water supply pump house and distribution line adjustment; and Greensboro sewer line adjustment.	Bridge pier treatment on Monongahela Railroad bridge and bank protection from r.m. 83.6 to r.m. 85.0; relocation of one coal loading dock; and Greensboro sewer line adjustment.
Real Estate	Acquire 43 acres in fee for lock and dam; acquire 200 acres of flowage easements; acquire 14 acres of bank protection easements; acquire 315 acres of modified flowage easements; relocate 7 families; and floodproof 43 habitable structures.	Acquire 35 acres in fee for lock and dam; acquire 184 acres of flowage easements; acquire 10 acres of bank protection easements; acquire 310 acres of modified flowage easements; relocate 18 families; and floodproof 31 habitable structures.
Other Considerations		80,000 cubic yards of streambed excavation; and high rock and terrain requires 600,000 cubic yards of common excavation and 10,000 cubic yards of rock excavation more than r.m. 82.2 site.
TOTAL PROJECT COSTS*	$78,100,000	$78,200,000

*Does not include E&D and S&A.

In the final analysis, the site at r.m. 82.2 (replacement for Lock and Dam 7), is the only site that warrants being carried further as a candidate replacement plan.

Based on the total cost, and considering the approach conditions and effects of high water with the raised pool through the Point Marion area, the replacement for Lock and Dam 8 offers only one candidate replacement plan to be carried on further in the study. This plan would locate a new lock landward of the existing lock at r.m. 90.8 (Point Marion). This selection would be the most economical choice, mainly because the relatively new gated dam would still be utilized.

Another possible replacement alternative is the selection of a site for the replacement of both Lock and Dam 7 and Lock and Dam 8. The two sites that merit further consideration are compared in TABLE 7.

An evaluation of TABLE 7 reveals that r.m. 83.6 (replacement for both Lock and Dam 7 and Lock and Dam 8) is the only site that warrants further consideration.

TABLE 7
MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
SITE COMPARISON FOR THE REPLACEMENT OF
LOCKS AND DAMS 7 AND 8

	R.M. 82.2 Right Bank	R.M. 83.6 Left Bank
Approach	Acceptable under all flows. Velocities at maximum navigable stage less than 6 feet per second.	Upstream approach could create problems for tows during high flows. Velocities in downstream approach would be less than 6 feet per second.
Relocations	Six highway bridges and 5 miles of highway to be adjusted; 3 railroad bridges and 4 miles of railroad to be adjusted; relocation of 1 coal loading dock and adjustment of 6 others; new water supply pump house and distribution line adjustment; and Greensboro and Point Marion sewer line adjustment.	Five highway bridges and 4 miles of highway to be adjusted; 3 railroad bridges and 4 miles of railroad to be adjusted; relocation of 1 coal loading dock and adjustment of 5 others; and Greensboro and Point Marion sewer line adjustment.
Real Estate	Acquire 43 acres in fee for lock and dam; acquire 601 acres of flowage easements and relocation of 92 families, 3 businesses and 1 church.	Acquire 35 acres in fee for lock and dam; acquire 520 acres of flowage easements and relocate 61 families, 3 businesses and 1 church.
Other Considerations	Pool raise and subsequent loss of power head at Lake Lynn. Possibility of flooding a major coal seam and creating extremely hazardous conditions for mining.	Pool raise and subsequent loss of power head at Lake Lynn. High rock and terrain requires 600,000 cubic yards of common excavation and 10,000 cubic yards of rock excavation more than at r.m. 82.2 site.
TOTAL PROJECT COSTS*	$177,500,000	$172,000,000

*Does not include E&D and S&A.

VI. DETAILED NAVIGATION PLANS

1. GENERAL

The following section is a summary of the pertinent benefit and cost data for each of the detailed navigation plans. Additional details of these analyses are contained in APPENDIX H.

The economic analysis of the considered plans has compared equivalent average annual charges, including interest, amortization, operation and maintenance, with the equivalent average annual benefits that would be realized over a 50-year period of analysis. Both benefits and costs are analyzed using this time period at an interest rate of 8-1/8 percent. Both benefits and costs are expressed in terms of October 1983 dollars.

2. LOCK SIZE

a. General. The present tow configuration traversing Locks 7 and 8 consist of six standard barges (2 wide x 3 long) and a towboat which must double lock. Once in the Maxwell Pool this tow would refleet with an earlier or following tow to form a nine standard barge tow (3 wide x 3 long) to proceed through Maxwell which consists of twin 84 feet wide by 720 feet long chambers. This is the present standard practice of the towing industry on the river on essentially all downbound tows and is accomplished in reverse order moving upstream.

The configuration of the Monongahela River with its sharp bends and narrow width control the tow size that can safely navigate thereon. These limits on tow size in turn limit the maximum useful lock size on the lower and middle river to 84 feet wide and 720 feet long. Discussions were conducte with towing companies using Locks 7 and 8. The companies have indicated that the maximum probable tow size would be nine standard barges or six jumbo barges. Both of these tow sizes require the 84 foot x 720 foot lock chamber size. The towing industry trend, an experience that is being realized in other parts of the Ohio River System, is to utilize jumbo barges to their fullest extent since they are the most cost effective way to move bulk commodities.

Several lock sizes were evaluated during this study, including a 56 foot x 360 foot size (present size of Locks 7 and 8), an 84 foot x 600 foot size (current size of three new structures in the upper Monongahela River) and an 84 foot x 720 foot size (existing size of Maxwell Locks and Dam, in the middle Monongahela River). The 84 foot x 720 foot lock size, as previousl stated above, is the maximum size lock that can be utilized to its fullest in this reach of river.

b. Replacement Cost. Each of the above-mentioned lock sizes exhibits a unique federal first cost, as well as a corresponding attributable benefit. An itemized description of first costs is shown in detail in APPENDIX I - COST ANALYSIS for the following plans:

a. A 56' x 360' lock and fixed crest dam at r.m. 82.2 (to replace Lock and Dam 7);

b. a 56' x 360' lock at r.m. 90.8 (to replace Lock 8);

c. a 56' x 360' lock and gated dam at r.m. 83.6 (to replace both Lock and Dam 7 and Lock and Dam 8);

d. an 84' x 720' lock and fixed crest dam at r.m. 82.2 (to replace Lock and Dam 7);

e. an 84' x 720' lock at r.m. 90.8 (to replace Lock 8); and

f. an 84' x 720' lock and gated dam at r.m. 83.6 (to replace both Lock and Dam 7 and Lock and Dam 8).

TABLE 8 provides a summary of federal first costs (by major item) for each lock size (56' x 360', 84' x 600' and 84' x 720') at the selected sites. Utilizing previously detailed costs, and prorating between the smaller and larger lock sizes, the first costs for an 84' x 600' lock chamber were obtained.

TABLE 8

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
SUMMARY OF FIRST COSTS
(Thousands of Dollars)
(October 1983 Cost Level)

SIZE OF LOCK	TYPE OF DAM	LOCK	DAM	CHANNELS AND CANALS	BUILDINGS, GROUNDS, UTILITIES AND PERMANENT OPERATING EQUIPMENT	POOL PREPARATION	RELOCATIONS	LANDS AND DAMAGES	OTHER	TOTAL 5/
Replacement for L/D 7 at r.m. 82.2										
56' x 360'	Fixed Crest	$47,000	$15,500	--	$900	$1,800	$5,000	$7,600	$ 300 6/	$78,100
84' x 600'	Fixed Crest	51,600	15,200	--	900	1,800	5,000	7,600	300 6/	82,400
84' x 720'	Fixed Crest	54,900	15,200	--	900	1,800	5,000	7,600	300 6/	85,700
Replacement for Lock 8 at r.m. 90.8										
56' x 360'	Gated 4/	47,000 2/	3,000 3/	--	900	2,000	--	100	--	53,000
84' x 600'	Gated 4/	55,200 2/	3,000 3/	--	900	2,000	--	100	--	61,200
84' x 720'	Gated 4/	58,300 2/	3,000 3/	--	900	2,000	--	100	--	64,300
Replacement for L/D 7 and L/D 8 at r.m. 83.6										
56' x 360'	Gated	67,600	44,100	--	900	6,600	30,900	12,800	9,100 1/	172,000
84' x 600'	Gated	75,200	38,400	--	900	6,600	30,900	12,800	9,100 1/	173,900
84' x 720'	Gated	78,300	38,400	--	900	6,600	30,900	12,800	9,100 1/	177,000

1/ Adjustments to Lake Lynn Power Station due to increase in pool level of Cheat River below dam (8,500) and Cultural Resource Investigation (600).
2/ Lock cost includes a fixed weir to replace the existing lock chamber.
3/ Reference detailed cost estimate for rehabilitation of existing dam and abutment replacement in APPENDIX B, STRUCTURAL CONDITION - REHABILITATION.
4/ Existing dam would be rehabilitated and retained.
5/ Does not include Engineering, Design, Supervision and Administration.

3. AVERAGE ANNUAL COST

TABLE 9 summarizes the average annual costs of the detailed navigation plans considered for continuation of the Monongahela River Navigation System at Locks and Dams 7 and 8. The first costs were based on an October 1983 cost level. The annual charges were determined using an estimated economic life of 50 years and an interest rate of 8-1/8 percent.

4. AVERAGE ANNUAL BENEFITS

a. Navigation. The National Economic Development (NED) benefits addressed in this report are the result of an extensive navigation system study of the various alternative plans and are detailed in APPENDIX J - BENEFIT EVALUATION.

The procedure to determine current potential benefits to commercial navigation follows the prescribed procedure in the Transportation Act of 1966 (Public Law 89-670) which states:

> "... the primary direct navigation benefits of a water resource project are defined as the product of the savings to shippers using the waterway and the estimated traffic that would use the waterway, where the savings to shippers shall be construed to mean the differences between (a) the freight rates or charges prevailing at the time of the study for this movement by the alternative means and (b) those which would be charged on the proposed waterway; and where the estimate of traffic that would use the waterway will be based on such freight rates, taking into account projections of the economic growth in the area."

The NED benefits and associated system impacts for the replacement plans are measured against those associated with the most probable future "without" project condition over the period of analysis. The condition and the benefits attributable to the future "without" project condition were addressed previously in SECTION III.

TABLE 10 summarizes the resulting NED navigation benefits. The benefits were developed for the Nathan Adjusted traffic flow projections which were discussed previously in SECTION II and are further detailed in APPENDIX A - PROBLEM IDENTIFICATION.

TABLE 9

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
COST COMPARISON OF DETAILED NAVIGATION PLANS
(October 1983 Cost Level)

	Rehabilitation "Without" Project Condition	Replacement-in-kind 56' x 360'	Replace with Larger Lock (84' x 600')	Replace with Larger Lock (84' x 720')	Replace with Higher Lift Single Facility (56' x 360')	Replace with Higher Lift Single Facility (84' x 600')	Replace with Higher Lift Single Facility (84' x 720')
PROJECT COSTS [1]							
Lock and Dam 7	$37,100,000	$ 78,100,000	$ 82,400,000	$ 85,700,000			
Lock and Dam 8	35,700,000	53,000,000	61,200,000	64,300,000			
Subtotal-Construction Cost	$72,800,000	$131,100,000	$143,600,000 [4]	$150,000,000 [4]	$172,000,000	$173,900,000	$177,000,000
Engineering & Design (5%)	3,640,000	6,560,000 [4]	7,180,000 [4]	7,500,000 [4]	8,600,000	8,695,000	8,850,000
Supervision & Administration (5%)	3,640,000	6,560,000	7,180,000	7,500,000	8,600,000	8,695,000	8,850,000
TOTAL FIRST COST	$80,080,000	$144,220,000	$157,960,000	$165,000,000	$189,200,000	$191,290,000	$194,700,000
Interest During Construction [2]	3,275,000	15,880,000	18,090,000	19,180,000	45,741,000	46,318,000	47,509,000
TOTAL INVESTMENT	$83,355,000	$160,100,000	$176,050,000	$184,180,000	$234,941,000	$237,608,000	$242,209,000
INCREMENTAL INVESTMENT	N/A	$ 76,745,000	$ 92,695,000	$100,825,000	$151,586,000	$154,253,000	$158,854,000
ANNUAL COSTS							
Interest (8-1/8%)	$ 6,773,000	$ 13,008,000	$ 14,304,000	$ 14,965,000	$ 19,089,000	$ 19,306,000	$ 19,679,000
Incremental Interest	N/A	6,235,000	7,531,000	8,192,000	12,316,000	12,533,000	12,906,000
Amortization (50 years)	139,000	267,000	294,000	307,000	392,000	396,000	404,000
Incremental Amortization	N/A	128,000	155,000	168,000	253,000	257,000	265,000
Operation, Maintenance and Extraordinary Maintenance [3]	950,000	735,000	710,000	683,000	405,000	380,000	355,000
Incremental Operation, Maintenance and Extraordinary Maintenance	N/A	(215,000)	(240,000)	(267,000)	(545,000)	(570,000)	(595,000)
TOTAL ANNUAL COSTS	$ 7,862,000	$ 14,010,000	$ 15,508,000	$ 15,955,000	$ 19,886,000	$ 20,082,000	$ 20,438,000
INCREMENTAL ANNUAL COSTS (Rounded)	N/A	$ 6,150,000	$ 7,450,000	$ 8,090,000	$ 12,024,000	$ 12,220,000	$ 12,576,000

Note: '( )' denotes negative quantities.

1/ Details in APPENDIX B for rehabilitation; APPENDIX I for 56' x 360' and 84' x 720' replacement structures, and APPENDIX H for 84' x 600' replacement structure.

2/ Based on a three-year construction time frame for the rehabilitation plan. Five years of construction is assumed for the two single lock replacements and for the single higher lift facility replacements.

3/ TABLE 7 of APPENDIX H illustrates the operation, maintenance and extraordinary maintenance costs for a fixed crest dam and an 84' x 720' lock; and a gated dam with an 84' x 720' lock. Other costs were determined by adjustments to the basic costs to account for their size, condition and type of dam being utilized.

4/ Includes model studies at Grays Landing Lock and Dam and Point Marion Lock and Dam.

TABLE 10

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
AVERAGE ANNUAL INCREASE IN NAVIGATION BENEFITS
ALTERNATIVE LOCK REPLACEMENT PLANS
(Millions of dollars)
(October 1983 Cost Level)

	Alternative Replacement Projects for L/D 7 and L/D 8			
	Two Single 56' x 360' Locks*	Two Single 84' x 720' Locks	One Higher Lift 56' x 360' Lock	One Higher Lift 84' x 720' Lock
Navigation benefits (Millions of $):				
Cost reduction	$1.00	$6.00	$2.60	$6.70
Shift of mode	0.00	0.70	0.00	0.70
Shift in origin-destination	0.00	0.00	0.00	0.00
New movement	0.00	0.00	0.00	0.00
Navigation benefits	$1.00	$6.70	$2.60	$7.40

* Replacement-in-kind.

The increase in benefits for the various replacement plans are generally the direct result of:

(1) the improvement in locking efficiency for the replacement-in-kind plan;

(2) the elimination of double lockages for the larger lock chamber plan; and

(3) the elimination of one lockage procedure for the plan that replaces two locks and dams with a single, higher lift facility.

Some of the benefits of the plans that provide 84' x 720' lock chambers were derived from the probability that shippers would elect to use larger tows and/or more of their jumbo barge fleet. Since the hourly operating cost for the jumbo barge tow would be $7.47 less than the stand-ard barge tow, it is considered probable that the alternative replacement plans involving 84' x 720' lock(s) would provide the impetus for the users of Locks 7 and 8 to shift to the use of jumbo barges.

APPENDIX J, however, did not address the benefits for an 84' x 600' lock. These benefits were derived by prorating the benefits between the smaller and larger locks. Approximately 40 percent (details in APPENDIX H - PLAN FORMULATION) of the increased benefits for an 84' x 720' lock, compared to a 56' x 360' lock, would be realized with an 84' x 600' lock. This 40 percent increase would amount to $2.68 million.

b. Advance Transportation System Adjustment. The implementation of many of the alternative plans would require adjustments to existing highway and railroad facilities. Included in these adjustments would be the raising of highway and railroad bridges and culverts to accommodate an increase in river pool elevation. A benefit would be realized by the owners of these bridges since they would be rebuilt in advance of their normally scheduled time for replacement. Therefore, consideration was given to the remaining practical life of the bridges that would require adjustment or replacement under the various replacement plans. It is estimated that the bridges have a remaining life of 20 years. Assuming that bridges have a project life of 50 years, replacement would extend the benefits realized for a 30-year period. The benefits for the replacement of the bridges were derived from the procedure outlined in EM 1120-2-104, and using an interest rate of 8-1/8 percent.

For the Two Locks and Dams Plan, one highway bridge would have to be replaced at an estimated cost of $2.2 million[1/], and the maintenance credit resulting from the replacement would be $20,000 annually. Using the methodology from the referenced EM the total benefit for this plan would amount to $51,000 annually.

The Single Lock and Dam Plan would involve the replacement of four highway bridges at an estimated cost of $13.9 million[1/], and three railroad bridges at an estimated cost of $13.4 million[1/], and a maintenance credit amounting to $140,000 annually for the seven bridges. The total benefits for this plan would amount to $551,000 annually.

1/ For the purpose of this analysis the benefit derived from the project is assumed to be equal to the cost.

c. Alleviated Cost of Closure. The benefits associated with the alleviated cost of closure amount to $73,211,000 for the 10-month closure resulting from the rehabilitation of Locks 7 and 8. The average annual benefit would be $6,070,000 based on an 8-1/8 percent interest rate and a 50-year project life. A detailed explanation is in APPENDIX H - PLAN FORMULATION AND EVALUATION (Economic Impacts of Closure).

d. Summary of Benefits. All of the average annual benefits used in the NED accounts are incremental to the benefits resulting from the "without" project condition. TABLE 11 summarizes the average annual benefits of the detailed navigation plans. The navigation related benefits were derived as detailed in APPENDIX J - BENEFIT EVALUATION.

5. NET BENEFIT SUMMARY OF DETAILED NAVIGATION PLANS

A summary comparison of the net benefits for each detailed navigation plan is presented in TABLE 12. This presentation is based on an incremental comparison to the "without" project condition. The SUPPLEMENT to this report contains a supplementary evaluation of all alternative actions available for the rehabilitation and replacement of Locks and Dams 7 and 8. The SUPPLEMENT presents additional data on a base condition that would prevail over the planning period in the absence of the implementation of any plan to solve the structural deterioration and navigation problems at the existing Locks and Dams 7 and 8.

TABLE 11

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
COMPARISON OF ANNUAL BENEFITS OF DETAILED NAVIGATION PLANS
(In millions)

	DETAILED NAVIGATION PLANS					
Benefits	Replacement in-kind (56' x 360')	Replacement w/Larger Locks (84' x 600')	Replacement w/Larger Locks (84' x 720')	Replacement w/Single Higher Lift Facility (56' x 360')	Replacement w/Single Higher Lift Facility (84' x 600')	Replacement w/Single Higher Lift Facility (84' x 720')
Navigation:						
Cost reduction	$1.00	$2.57	$6.00	$2.60	$4.77	$6.70
Shift of mode	0.00	0.00	0.70	0.00	0.00	0.70
Advance Transportation System Adjustment	0.05	0.05	0.05	0.55	0.55	0.55
Closure Cost Alleviated	6.07	6.07	6.07	6.07	6.07	6.07
Lake Lynn Power Loss 1/	0.00	0.00	0.00	(0.84)	(0.84)	(0.84)
TOTAL	$7.12	$8.69	$12.82	$8.38	$10.55	$13.18

Note: "( )" denotes negative quantities.

1/ Estimated value of loss of generation at Lake Lynn Power Station, owned by West Penn Power Company, because of loss of power head, as substantiated by their letter to LTC Ralph W. Gilbert, Jr., Deputy District Engineer, Pittsburgh District dated November 23, 1982.

TABLE 12

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
COMPARISON OF NET BENEFITS OF DETAILED NAVIGATION PLANS
(In millions)

	DETAILED NAVIGATION PLAN					
	Replacement in-kind (56' x 360')	Replacement w/Larger Locks (84' x 600')	Replacement w/Larger Locks (84' x 720')	Replacement w/Single Higher Lift Facility (56' x 360')	Replacement w/Single Higher Lift Facility (84' x 600')	Replacement w/Single Higher Lift Facility (84' x 720')
Average Annual Cost	$6.15	$7.45	$ 8.09	$12.02	$12.22	$12.58
Average Annual Benefits	7.12	8.69	12.82	8.38	10.55	13.18
Net Benefits	$0.97	$1.24	$ 4.73	$(3.64)	$(1.67)	$0.60

Note: "( )" denotes negative quantities.

VII. HYDROPOWER EVALUATION OF DETAILED NAVIGATION PLANS

1. GENERAL

During the past decade, several interacting factors have prompted a search for new energy alternatives; among them, rises in fossil fuel prices, the rapid escalation of the cost of generating facilities and increased public concern over the safety of nuclear power plants. Hydroelectric power development, in particular, has been the focus of renewed attention as a potentially important contributor to the increasing national energy needs. The Monongahela River has the potential to contribute to this need by utilizing the existing and/or new navigation dams for hydropower.

2. ALTERNATIVES CONSIDERED

To insure full utilization of this hydropower potential, an examination was made of the possibility of developing hydropower in conjunction with each of the viable alternative plans under consideration for the Locks and Dams 7 and 8 reach of the Monongahela River. The alternatives considered included (1) utilizing the existing dam abutments for the construction of hydropower facilities; (2) the replacement of Lock and Dam 7 with a new facility at Grays Landing, Pa.; and (3) the replacement of both Lock and Dam 7 and Lock and Dam 8 with a single lock and dam facility at River Mile 83.6.

3. EVALUATION CRITERIA

a. Cost Estimates. Capital cost estimates were prepared for a range of installed capacities for each of the viable alternative navigation plans. The overall extent of the range of capacities was chosen to allow a determination of the maximization of net benefits. The cost estimates, detailed in APPENDIX H - PLAN FORMULATION, were based on The Institute for Water Resources recent (July 1979) "Feasibility Studies for Small Scale Hydropower Additions". The estimates were updated to the October 1983 cost level by utilizing the Engineering News Record (ENR) index. TABLE 13 summarizes the annual costs of each alternative plan.

b. Run-of-River Operation. A computer program "NAVOP" was used to determine the dependable capacity and energy output for the run-of-river hydropower evaluations. A summary of the input and output of this computer analysis for each of the alternatives is shown in EXHIBITS A through D in APPENDIX H - PLAN FORMULATION.

c. Peaking Operation. The rehabilitation or replacement of Lock and Dam 7 and the alternative that would replace both Locks and Dams 7 and 8 with a single facility offer the opportunity for the development of peaking power in addition to the run-of-river operation. This type of operation would utilize peaking releases from the Monongahela Power Company's Lake Lynn plant (located on the Cheat River) which enters the Monongahela River at r.m. 89.6.

TABLE 13

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
COST COMPARISON OF HYDROPOWER ALTERNATIVES[1/]
(Thousands of Dollars)
(October 1983 Cost Level)

	Existing Lock and Dam 7			Existing Lock and Dam 8			Replacement of Lock and Dam 7 at R.M. 82.2			Replacement of Locks and Dams 7 & 8 at R.M. 83.6		
	2 MW	4 MW	6 MW	2 MW	4 MW	6 MW	2 MW	4 MW	6 MW	3 MW	15 MW	24 MW
TOTAL FIRST COST[2/]	7,500	9,900	16,800	7,900	10,300	17,100	5,900	8,400	15,200	5,300	20,700	33,800
Interest During Construction[3/]	1,000	1,300	2,100	1,000	1,300	2,200	800	1,100	1,900	700	2,600	4,300
TOTAL INVESTMENT	8,500	11,200	18,900	8,900	11,600	19,300	6,700	9,500	17,100	6,000	23,300	38,100
ANNUAL COST												
Interest (8-1/8%)	700	900	1,500	700	900	1,600	600	800	1,400	500	1,900	3,000
Amortization (50 years)	–	–	–	–	–	–	–	–	–	–	–	100
Operation, Maintenance and Major Replacement	100	100	100	100	100	100	100	100	100	100	200	300
TOTAL ANNUAL COST (Rounded)	800	1,000	1,600	800	1,000	1,700	700	900	1,500	600	2,100	3,400

Note: "MW" denotes Megawatt

1/ Cost in addition to expenses incurred by navigation alternatives.
2/ Details in APPENDIX H - PLAN FORMULATION.
3/ Based on a 3-year construction time frame.

The analysis of peaking capacity and energy was accomplished using daily flow releases from the Lake Lynn Power Station and then adjusted to appropriately reflect instream storage and travel time lag. These adjustments were determined by comparing the daily release records from Lake Lynn with the daily flow record at existing Lock and Dam 7.

4. ENERGY AND CAPACITY VALUES

The value of the energy and capacity produced by the various hydropower developments was provided by the New York Regional Office of the Federal Energy Regulatory Commission (FERC). These values were based on weekly generation and the most likely alternative source of energy (determined by FERC to be a coal-fired steam plant). The FERC values are shown in TABLE 14.

5. COSTS AND BENEFITS

The annual energy and capacity benefits for each of the alternative hydropower installations were developed in APPENDIX H - PLAN FORMULATION. TABLE 15 summarizes the annual costs and benefits of these installations and concludes with the net benefits of each.

This analysis clearly shows that the inclusion of hydropower development at existing Dam 8 (in conjunction with either the rehabilitation or the lock replacement alternative), is not feasible, since costs exceed the expected benefit.

The power plant at either existing Monongahela River Lock and Dam 7 or the proposed replacement facility for existing Lock and Dam 7 (Grays Landing Site, River Mile 82.2) would be a combined run-of-river and peaking operation; using the normal Monongahela River flows for the run-of-river operation and releases from the Lake Lynn Power Station for the peaking operation. Under peaking conditions, the dependable capacity of either installation would be 1.8 MW. However, low summer flows in the Monongahela River would prevent the development of dependable capacity in the run-of-river mode. An analysis of both installations indicated that a power installation at either site would not be feasible because costs exceeded the expected benefit from the dependable capacity and energy generated.

The most feasible hydropower development available for use in conjunction with a single lock and dam replacement for both Locks and Dams 7 and 8 appears to be a 15 MW, combined run-of-river/peaking plant. The dependable capacity for this installation would be 3.7 MW during peaking operation, since lower summer flows would prevent a dependable run-of-river operation. Annual energy production would average 57,300 MWH for run-of-river and 41,828 MWH for peaking. The first cost of this installation would be $20,724,000, with an annual cost of $2,161,000 and an annual benefit of $2,595,000. This would provide a benefit-to-cost ratio of 1.20.

TABLE 14

NONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
AT-MARKET POWER VALUES
FEDERAL FINANCING

Capacity Factor - %	Alternative	As of October 1983 Capacity Value $/Kw - Year, 8-1/8%	Energy Value - cts/KWH Oct 1983 1/	L.C.C. 2/	Marginal 2/
15	CCP	$147.00	2.0	2.3	2.4
20	CCP	147.00	1.9	2.3	2.4
30	BCP	209.00	1.5	1.8	2.4
40	BCP	209.00	1.6	1.9	2.4
50	BCP	209.00	1.6	1.9	2.4
60	BCP	209.00	1.6	1.9	2.4
70	BCP	209.00	1.7	2.0	2.4
76	BCP	209.00	1.6	1.9	2.0

Notes: Federal Financing - 8-1/8%
CCP - Cycling Coal Plant
BCP - Base Coal Plant
LCC - Life Cycle Cost (100 years)
Capacity values rounded to nearest half dollar
Energy values rounded to nearest tenth of a cent
Market - Allegheny Power System
Capacity and energy values based on a telephone conversation with the FERC New York Regional Office on 29 November 1983.

1/ Project-on-line 1983

2/ Project-on-line 1993

TABLE 15

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
BENEFIT-COST COMPARISON OF HYDROPOWER ALTERNATIVES*
(Thousands of Dollars)
(October 1983 Cost Level)

	Existing Lock and Dam 7			Existing Lock and Dam 8			Replacement of Lock and Dam 7 at R.M. 82.2			Replacement of Locks and Dams 7 & 8 at R.M. 83.6		
	2 MW	4 MW	6 MW	2 MW	4 MW	6 MW	2 MW	4 MW	6 MW	3 MW	15 MW	24 MW
TOTAL ANNUAL HYDROELECTRIC BENEFIT												
Run-of-River	300	400	500	200	300	400	300	400	500	400	1,100	1,300
Peaking	300	400	600	-	-	-	300	400	600	500	1,500	1,600
TOTAL ANNUAL COST	800	1,000	1,700	800	1,100	1,700	700	900	1,600	600	2,200	3,500
NET BENEFIT ♯	(200)	(200)	(600)	(600)	(800)	(1,300)	(100)	(100)	(500)	300	400	(600)

Note: "MW" denotes Megawatt.
* Benefits and costs are in addition to those incurred by navigation alternatives.
♯ "( )" denotes negative quantities.

6. SUMMARY

The preceding analysis has demonstrated that it is feasible to install hydroelectric power only at the single lock and dam replacement site for both Locks and Dams 7 and 8 (R.M. 83.6). This feasibility depends primarily on peaking power generation flows released from the existing Monongahela Power Company's Lake Lynn dam on the Cheat River. Very close coordination would, therefore, be required between the power company and the Federal Government to insure that these flows would be available when needed, by the new power plant. In addition, the existing private power facility has been in operation for more than 50 years and there is some uncertainty as to the ability of this plant to continue to function throughout the life of the new lock and dam. Although feasible from an economic standpoint, hydropower is not considered a viable addition to this plan for the above reasons. However, because of the sensitivity of hydropower benefits to fluctuating fuel costs, any future dam abutment would be designed so as not to preclude the possibility of a future hydropower facility being added to the project.

SECTION VIII. DETAILED PLAN EVALUATION

A thorough analysis of all detailed navigation and hydropower plans, as previously described, indicates that two plans display cost and benefit totals warranting further evaluation. The first of these would provide a new lock, with chamber dimensions of 84 x 720 feet, and a new fixed crest dam at r.m. 82.2, to replace existing Lock and Dam 7; and a new lock, with chamber dimensions of 84 x 720 feet, landward of existing Lock 8 (r.m. 90.8) to replace existing Lock 8. The second of these two plans would provide a new lock, with chamber dimensions of 84 x 720 feet, and a new gated dam at r.m. 83.6, to replace both existing Lock and Dam 7 and Lock and Dam 8. The effects of each plan on the NED, EQ, OSE and RED accounts are illustrated in TABLE 16. This table shows that the plan demonstrating the maximum net benefits would also be the least detrimental to society and the environment. Therefore, the plan for a new 84' x 720' lock and fixed crest dam at r.m. 82.2, to be named Grays Landing Lock and Dam, and a new 84' x 720' lock landward of the existing lock site (r.m. 90.8) at Lock and Dam 8, to be renamed Point Marion Lock and Dam, is adopted as the selected plan.

TABLE 16

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
SUMMARY COMPARISON OF DETAILED PLANS
(October 1983 Cost Level)

PLAN DESCRIPTION	Replacement w/Two Facilities 84' x 720' Lock Chambers Replace existing Lock and Dam 7 with a new 84' x 720' lock and fixed crest dam at Grays Landing (R.M. 82.2) and replace existing Lock 8 with a new 84' x 720' lock at Point Marion (R.M. 90.8). Raise the pool level 15 feet from R.M. 82.2 to existing Lock and Dam 7 (R.M. 85.0).	Replacement w/Single Facility 84' x 720' Lock Chamber Replace existing Lock and Dam 7 (R.M. 85.0) and existing Lock and Dam 8 (R.M. 90.8) with a new 84' x 720' lock and gated dam at Greensboro (R.M. 83.6). Raise the pool level 34 feet from R.M. 83.6 to R.M. 85.0 and 19 feet from R.M. 85.0 to R.M. 90.8.
IMPACT ASSESSMENT		
A. NATIONAL ECONOMIC DEVELOPMENT (NED) 1/		
BENEFITS (ANNUAL)		
(1) Navigation	$ 6,700,000	$ 7,400,000
Alleviated Closure Cost	6,070,000	6,070,000
Advanced Transportation Season Adjustment	50,000	550,000
Lake Lynn Power Loss	0.00	(840,000)
TOTAL (Rounded)	$12,820,000	$13,180,000
COSTS (ANNUAL)		
(2) Construction	$ 8,360,000	$13,171,000
Operation, Maintenance and Extraordinary Maintenance	(267,000)	(595,000)
TOTAL (Rounded)	$ 8,090,000	$12,576,000
(3) NET BENEFIT	$ 4,730,000	$ 600,000
(4) B/C RATIO	1.6	1.0
B. ENVIRONMENTAL QUALITY (EQ)		
BENEFICIAL EFFECTS		
(1) Terrestrial Communities	No Effect	No Effect
(2) Aquatic Communities	No Effect	No Effect
(3) Water Quality	No Effect	No Effect
(4) Cultural Resources	No Effect	No Effect
ADVERSE EFFECTS		
(1) Terrestrial Communities	Loss of 112 acres of terrestrial habitat.	Loss of 325 acres of terrestrial habitat.
(2) Aquatic Communities	Net loss of 36 acres of shallow water area.	Net loss of 38.9 acres of shallow water area.
(3) Water Quality	Temporary increase in turbidity during construction. Minor increases in dissolved oxygen and thermal stratification.	Temporary increase in turbidity during construction. Significant increases in dissolved oxygen and thermal stratification.
(4) Cultural Resources	Could impact on 5 sites that may be eligible for inclusion on the National Register of Historic Places.	Could impact on 10 sites which may be eligible for inclusion on the National Register of Historic Places.
C. OTHER SOCIAL EFFECTS (OSE)	No known significant effects.	No known significant effects.
D. REGIONAL DEVELOPMENT (RD)		
EFFECTS		
(1) Income	No known significant effects.	No known significant effects.
(2) Employment	No known significant effects	No known significant effects.
(3) Population 2/	Displacement of 7 families because of lock construction.	Displacement of 61 families, 3 businesses and 1 church because of inundation.
(4) Tax Revenue	No known significant effects.	No known significant effects.
(5) Property Value	No known significant effects.	No known significant effects.

Note: "( )" denotes negative quantities.

1/ Total costs and total benefits are presented in the SUPPLEMENT to the MAIN REPORT for all of the alternatives that were evaluated.

2/ The acquisition of 315 acres of modified flowage easements, for the two facilities replacement plan, could possibly require the relocation of 10 additional families.

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IX. SELECTED PLAN

1. GRAYS LANDING LOCK AND DAM

a. Site. The plan of improvement entails the construction of a new lock and dam structure at r.m. 82.2 in the vicinity of the community of Grays Landing, Pennsylvania, 2.8 river miles downstream from existing Lock and Dam 7. At this site, the river is straight for more than a mile, and in conjunction with the considerable river width, both up and downstream, makes it extremely adaptable to the requirements of a modern navigation facility. A general plan of the Grays Landing site is shown on PLATE 4 with a detailed layout of the lock and dam in plan and elevation contained on PLATES 5 and 6.

b. Dam. The non-navigable dam would be of the overflow spillway type extending 576 feet from the river face of the lock river wall to the river face of the abutment. It would be a concrete gravity structure founded on rock with a crest at elevation 778, with the top of the abutment wall at elevation 795. The existing Maxwell Pool, at elevation 763, would be shortened and the existing Pool 7 at elevation 778 would be extended downstream to the new dam. There would be no change in the pool level upstream of existing Dam 7.

c. Lock. The 84' x 720' lock chamber would be filled and emptied by two culverts, with side wall ports, one in each lock wall. Both culverts would discharge at the downstream river face of the river wall. Three emergency bulkhead units, one of the overflow type and two of the non-overflow type, maneuvered by a traveling hoist operating from the service bridge over the lock, would be provided for an emergency closure upstream of the miter gates. These bulkheads would also be employed when the lock is utilized as a floodway during high river flows. Storage of these units would be in a concrete-lined pit landward of the land lock wall. The lock walls and guide walls would be founded on firm rock. The upper guard wall would be founded on intermittent steel sheet piling cells providing ports beneath the wall, while the lower guard wall would be founded on continuous sheet piling cells of the diaphragm type. The top of the lock walls would be at elevation 792.5.

d. Channel. The navigable channel in the pool between the new Grays Landing structure and the Point Marion Lock and Dam is somewhat narrow and would require the excavation of approximately 39,000 cubic yards of material to effect a minimum nine-foot project channel with a 300-foot bottom width throughout this reach of river. The major portion of this dredging would be confined to the vicinity of existing Lock and Dam 7 after its removal. Disposal of this dredged material would be in the immediate vicinity of existing Lock and Dam 7 and above the level of the 100-year flood and in a manner that its return to the river would be prevented. Dredging would also be required in the downstream approach to the new Grays Landing Lock to provide a nine-foot channel of 400-foot bottom width.

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e. Visitor Facilities. Provisions would be made at the Grays Landing Lock site for visitors. The Operations Building would include public restroom facilities, an interpretive area and an observation platform for viewing the operation of the lock. Parking areas for cars would be provided as well as picnicking facilities and fishermen access. A general layout of this visitor development is shown on PLATE 5.

f. Land Acquisition/Floodproofing. It is estimated that approximately 43 acres would be acquired in fee, to construct and operate the proposed lock and dam. In addition, normal flowage easements for over 200 acres would be needed to accommodate the raise in pool between the old and new dams. The access road into the lock site would require a road easement on approximately 1-1/2 acres. The taking lines required for the Grays Landing Pool adjustment are shown on PLATE 7. An additional band of 315 acres of modified flowage easements would be acquired above the taking lines on PLATE 7, up to and approximating the modified 100-year flood profile. Standard estates for occasional flooding would be used, but adapted to permit 43 habitable structures, including, but not limited to, residences to remain on the easement area should the landowner prefer not to relocate. Owners would also be afforded the option of having their house or business improvement floodproofed to the limit of the modified 100-year flood level at project expense, provided that the cost of such floodproofing does not approach the fee value of the structure. Floodproofing would be achieved through various combinations of basement protection only or basement and first floor level protection. The techniques comprising these combinations include the sealing of foundation walls, installation of sewer valves and sump pump systems, permanent closure of basement openings such as windows, raising of the superstructure, access and utility adjustments.

Discussions with similarly situated landowners at other Corps projects indicated a strong preference for floodproofing in lieu of relocating. It is assumed that most owners impacted by Grays Landing Dam will prefer one of the floodproofing options to relocation. Such arrangements will necessarily be worked out through negotiations and direct purchase settlements. Should it not be possible to reach an amicable agreement with a landowner, or if a residence or business structure is of a design that it cannot be floodproofed, a standard flowage easement estate would be acquired. Therefore, it follows that if condemnation is necessary, the standard estate for occasional flooding will be used and no exceptions will be made to allow structures to remain in the easement area.

g. Pool Preparation. In conjunction with the pool raise associated with the Grays Landing project, the land would be selectively cleared of trees and brush between the project site and existing Lock and Dam 7. This clearing would be confined between the existing Maxwell Pool elevation of 763 and elevation 781, three feet above the new pool level, and would involve a total of about 58 acres of land. In addition to the clearing of these riverbanks, where necessary, they would be protected or stabilized using suitable material from the lock and dam excavation. The areas requiring such stabilization would be defined during more detailed post-authorization studies. In general, however, the protection would extend from two feet below the new pool level to about three feet above, which corresponds to the clearing elevation.

h. Relocations. The replacement of existing Lock and Dam 7 at river mile 85.0 with the Grays Landing project at river mile 82.2 and the subsequent raise of 2.8 miles of river by 15 feet would require the adjustment or reconstruction of the following existing facilities:

(1) Highways. At r.m. 83.1, right bank, replace concrete arch with a steel girder bridge over Jacobs Creek. At r.m. 84.9, right bank, 0.25 mile up Georges Creek, protect wing walls of bridge on LR 26081. Contact was made in August 1982 with the U.S. Department of Transportation and the Pennsylvania Department of Transportation requesting their opinion as to the desirability of a highway bridge across the lock and dam structure. Both departments responded in February 1983 that there was not sufficient justification for construction of additional bridges over the Monongahela River in the project area.

(2) Railroad. At r.m. 83.1, right bank, Monongahela Railroad bridge No. 27.45, install arch (auxiliary pipe-liner plate) over Jacobs Creek. At r.m. 84.2, right bank, Monongahela Railroad bridge No. 28.48, prepare bridge for partial submergence. At r.m. 84.9, right bank, Monongahela Railroad bridge No. 29.26, prepare bridge pier at Georges Creek for submergence. From r.m. 83.2 to r.m. 84.9, right bank, provide bank protection for the Monongahela Railroad.

(3) Sewers. From r.m. 84.0 to r.m. 89.0, right bank, adjust Greensboro Borough Sewer System by raising sewer lines and outfalls to accommodate the pool raise.

(4) Water Supply. At r.m. 83.1, right bank, replace existing pump house, owned by New Geneva Water Co., alo g Jacobs Creek, to permit the removal of the highway arch spanning Jacobs Creek. At r.m. 83.1, right bank, relocate 4-inch pipeline, owned by New Geneva Water Co., crossing Jacobs Creek at upstream end of Monongahela Railroad arch, and relocate along Jacobs Creek.

(5) Terminal Adjustments. At r.m. 83.0, left bank, alterations to Duquesne Light Co. Warwick Mine Tipple, including relocations of the platform, chute and appurtenances of the coal loading facility downstream to the Maxwell Pool.

1. Fish and Wildlife Impacts. Potential impacts to fish and wildlife resources are identified and discussed in the report from the U.S. Fish and Wildlife Service attached as APPENDIX K. This report recommends measures to compensate for identified losses which are in accordance with the Service's current policy. These recommendations are to be accomplished through standard design practices and provisions for the health and safety of visitors. Therefore, separate mitigation features are not required.

Terrestrial wildlife habitat would be lost through inundation by the pool raise, facilities construction, and the disposal of excavated and dredged material. This land is generally of average habitat value and, as discussed in APPENDIX K, habitat loss will be minimized through management of project lands to increase their value to wildlife. Specific management practices, such as planting for wildlife food and cover and selective mowing, will be identified in detail in future engineering studies.

There would be a loss of shallow water habitat along the 2.8-mile reach of the 15-foot pool raise. The present 53 acres of shallow water habitat in this reach would be reduced to 17 acres. This loss of productive habitat will be minimized through design considerations to improve fish habitat quality along the reach of the pool raise.

Potential considerations include configuration of bank protection and haul roads used to transport bank protection materials, selective placement of concrete rubble obtained from Lock and Dam 7, and selective clearing of trees and brush.

The tailwater area of navigation dams on the river support diverse fish populations and concentrate game fish. Consequently, the tailwater areas provide high fishing success and are the focal point of fishing activity. Presently there is easy access to the Dam 7 tailwaters and it is a popular fishing area. Access to the abutment of Grays Landing Dam would also be easy. Accordingly, minimum facilities for the health and safety of visitors will be provided.

2. POINT MARION LOCK AND DAM

a. Site. The plan of improvement at this navigation facility would entail the construction of a new lock landward of the existing lock, at Lock and Dam 8, in the vicinity of Point Marion, Pennsylvania; the rehabilitation of the existing dam; and the construction of a new abutment to replace the present deteriorated structure. A general site plan and project plan and elevations of the proposed work are shown on PLATES 8, 9 and 10.

b. Lock. Initial construction would be on the new lock, 84' x 720' clear dimensions, landward of the existing lock, as shown on PLATES 9 and 10. The new lock would be constructed with the river face of the new river wall located 10 feet landward of the average heel line of the existing land and guide walls. The existing land wall and the upper and lower guide walls would be anchored to rock by means of post-tensioned anchor rods in drilled holes. Even with the addition of these anchors, the walls would not be stable after removal of backfill material for construction of the new lock. Because the depth and base width requirements for the new river wall would place its foundations below and close to the land wall foundations, this condition is critical and will require extremely careful treatment both in the design stage and during construction to positively insure the structural integrity and stability of the existing walls. The integrity of the walls would be insured by means of post-tensioned anchor rods in the opposite face of the land wall, staged excavation, strutting as required, anchor blocks at the wall toe, and protection of the exposed rock surfaces adjacent to the existing walls. The future river wall would be constructed entirely within an internally braced (strutted) excavation, one side of which would be the existing land wall, and the other side would be a steel sheet pile bulkhead on the landward side of the excavation. The struts would replace the support provided to the land wall by the backfill as the excavation for the future river wall progresses. Once the new river wall is constructed to a point where it can provide lateral support to the existing land wall, excavation for the future land wall can then proceed. A temporary operations building would be located on the existing river wall adjacent to pier No. 1 of the dam to provide for the operation of the

existing lock during construction. The main lock walls and the lower guide and guard walls of the new lock would be founded on firm rock. The upper guide wall concrete section would be supported on continuous steel sheet-piling cells of the diaphragm type, driven to rock. There would be no upper guard wall. The top of the lock walls would be at elevation 803.0, six feet above normal pool. Because of the sharp angle in the downstream approach, a pivoting pier and turning basin would be constructed just downstream of the lower guide wall to assist chamber filling downbound tows exiting the lock. The floor of the basin would be excavated to the 765.0 elevation of the approach channel. The pier would be founded on rock and provided with wall armor, line hooks, and check posts. Lock filling and emptying would be accomplished by two culverts with side wall ports, one culvert in each lock wall. Both culverts would discharge into the river downstream of the dam, through the lower end of the river wall. The two upstream emergency bulkhead units, designed for placement under open flow conditions, would have the supplementary function of skimming ice and debris from the forebay of the lock. They would be placed by a hoist traveling on parallel steel girder spans over the lock chamber. Steel girders, in lieu of post-tensioned concrete, would match the girders on the service bridge over the dam which are also steel and would result in lighter loads on the supporting piers. The emergency bulkhead structure would span the lock forebay and an adjacent bulkhead storage area. Access to the existing service bridge would be provided by a steel plate girder footbridge spanning the new fixed weir, the new lock, and the esplanade area. The span crossing the esplanade would provide a vertical clearance of 15 feet and would be accessible from the adjacent fill. The other two spans and the emergency bulkhead structure spans would provide a navigation clearance of 55.5 feet above level upper pool. This clearance would be the same as that provided at the Maxwell Locks and contemplated for the future placement of Locks 4, and is the adopted standard clearance for all new projects in the lower and middle reaches of the Monongahela River.

c. Dam, Fixed Weir and Abutment. The existing gated dam would be upgraded. This rehabilitative effort would consist of the repair of the spalled downstream face of the gate sills and the cracks around the service bridge seats and the anchoring of the piers and gate sill monoliths of the dam into firm rock with prestressed rock anchors. A new 110-foot fixed weir would be constructed to replace the existing lock chamber. The concrete of the existing 65-foot fixed weir adjacent to the abutment would be repaired and additional stone protection provided downstream. A new abutment, to replace the present deteriorated structure would be constructed on the right bank and located with the river face 30 feet riverward of the existing abutment. It would have a length of 115.3 feet and would be founded partially on the existing fixed weir and stilling basin. The profile of the new structure would follow that of the existing abutment with a top at elevation 805 upstream, and elevation 799 downstream of the weir section.

d. Channel and Pool Preparation. Since there would be no change to the existing pool elevation above Point Marion Dam, no pool preparation or dredging would be required.

The approaches to the new lock would require some excavation. Most of the excavation would be done in the dry, but a portion would require some dredging. In the upper approach, approximately 368,000 cubic yards of material would be removed. The lower approach would necessitate the excavation of approximately 200,000 cubic yards from the approach and turning basin.

The turning basin and pivot pier, to be constructed in the lower approach, would improve the exiting conditions encountered by downbound tows. The pivoting pier would be a concrete gravity structure founded in rock and provided with wall armor, line hooks and check posts. The turning basin would be excavated to elevation 765.0, the same elevation as the approach channel.

Disposal of the entire 568,000 cubic yards of excavated material would be landward of the new lock and would extend upstream to the vicinity of Crooked Run. The elevation of this disposal area would be at or above the 100-year flood level and placement of the material would be in such a manner that its return to the river would be prevented. Adequate drainage and subsequent seeding would be provided for all disposal areas.

e. Visitor Facilities. Provisions would be made at the Point Marion Lock site to accommodate visitors. The Operations Building would include public restroom facilities and interpretive area, and an observation platform for viewing the locks. Parking areas, as well as picnicking facilities, would also be provided. A general layout of this visitor development is shown on PLATE 9.

f. Land Acquisition. It is estimated that this project would require about 47 acres of additional real estate, to be acquired in fee, at the lock and abutment sites.

g. Relocations. To accommodate the proposed construction of the new Point Marion Lock, the following facilities would require adjustment:

(1) At r.m. 90.4, left bank, approximately 0.26 mile of LR 30043, Dunkard Township, Greene County, Pa., would be adjusted to provide access to the new locks and to continue to accommodate thru traffic. Contact was made in August 1982 with the U.S. Department of Transportation and the Pennsylvania Department of Transportation requesting their opinion as to the desirability of a highway bridge across the lock and dam structure. Both departments responded in February 1983 that there was not sufficient justification for construction of additional bridges over the Monongahela River in the project area.

(2) As a consequence of the adjustment to LR 30043, bank excavation and channel dredging at the new lock site, two gas lines, one 6-inch and one 4-inch, r.m. 90.4, owned by the Peoples Natural Gas Co. would require relocation.

(3) At r.m. 90.5, in the vicinity of the new lock site and as a result of the bank excavation and channel dredging, an adjustment to Keystone Gas Co. 6-inch gas line would be required.

(4) At r.m. 91.3 and 91.5, left bank, two active gas wells, owned by the Keystone Gas Co., would be plugged.

(5) At r.m. 90.4 and 90.5, two 6-inch gas line crossings, one owned by the Peoples Natural Gas Co. and the other owned by the Keystone Natural Gas Co., would require relocation due to the proposed construction of the lock.

h. Fish and Wildlife Impacts. Potential impacts to fish and wildlife resources are identified and discussed in the report from the U.S. Fish and Wildlife Service attached as APPENDIX K. This report recommends measures to compensate for identified losses which are in accordance with the Service's current policy. These recommendations (except for angler access to the abutment) are to be accomplished through standard practices and provisions for the health and safety of visitors. Therefore, separate mitigation features are not required.

Terrestrial wildlife habitat would be lost through construction and disposal activities. This land is generally of average habitat value and, as discussed in APPENDIX K, this habitat loss will be minimized through management of project lands to increase their value to wildlife. Specific management practices, such as planting for wildlife food and cover and selective mowing, will be identified in detail in future engineering studies.

Since there would be no change to the existing pool elevation above and below Point Marion Dam, there would be no significant effect on aquatic habitat.

3. SEPARATE PROJECT JUSTIFICATION

It is not considered appropriate to separate the proposed two lock and dam projects for the purposes of either economic evaluation or authorization. Work on both projects is essential to maintaining the navigation system. Because of the commonability of traffic through these two locks, providing for the replacement of only one of the two projects will not realize the full benefit of that replacement. The full range of benefits identified can only be realized by the timely and simultaneous completion of both facilities.

4. IMPACTS OF THE SELECTED PLAN

The selected plan would impact on the economy, social well being and environment of the project area. TABLE 16, previously presented in this report, summarizes the effects that the selected plan would have on these accounts. TABLE 17 following, displays the effects the selected plan would have on the natural and cultural resources within the project area.

TABLE 17

MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY

EFFECTS OF THE SELECTED PLAN ON ENVIRONMENTAL RESOURCES OF PRINCIPAL NATIONAL RECOGNITION

TYPES OF RESOURCES	PRINCIPAL SOURCES OF NATIONAL RECOGNITION	MEASUREMENT OF EFFECT
Air Quality	Clean Air Act as amended (42 U.S.C. 1857h-7 et seq.).	No effect.
Areas of Particular Concern within the Coastal Zone	Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1458 et seq.).	Not present in planning area.
Endangered and Threatened Species Critical Habitat	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).	Not present in planning area.
Fish and Wildlife Habitat	Fish and Wildlife Coordination Act (16 U.S.C. Sec 661 et seq.).	Loss of 36 acres of littoral zone. Loss of 112 acres of terrestrial habitat. Modification of 82 acres of terrestrial habitat by disposal.
Floodplains	Executive Order 11988, Floodplain Management.	Loss of 112 acres.
Historic and Cultural Properties	National Historic Preservation Act of 1966, as amended. (16 U.S.C. Sec 470 et seq.).	May affect five potentially eligible sites.
Prime and Unique Farmland	CEQ Memorandum of August 1, 1980; Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act.	Loss of prime farmland soils within disposal areas.
Water Quality	Clean Water Act of 1977 (33 U.S.C. 1251 et seq.).	No effect.
Wetlands	Executive Order 11990, Protection of Wetlands Clean Water Act of 1977. (42 U.S.C. 1857h-7 et seq.).	Loss of 1.71 acres of palustrine emergent wetland.
Wild and Scenic Rivers	Wild and Scenic Rivers Act, as amended. (16 U.S.C. 1271 et seq.).	Not present in planning area.

X. CONCLUSIONS

Based on the investigations and analyses made for this report, it is concluded that the overall structural condition of existing Lock and Dam 7 and Lock 8 warrants immediate action to insure the continuation of navigation service through this reach of the Monongahela River. Such action, in the form of replacement facilities, is essential to the continued efficient and economic operation and maintenance of suitable navigation facilities through this portion of the river and would be in accordance with existing laws and policies.

After considering all technical information, public views, and economic, environmental and social impacts, it is concluded that the selected plan, herein described, represents the most economically beneficial as well as the least environmentally damaging of all plans considered. The selected plan thereby warrants Federal participation.

A sensitivity analysis of the impacts of pending cost recovery legislation on the benefits attributed to the replacement of Lock and Dam 7 and Lock 8 was conducted and is detailed in SECTION VI, APPENDIX J.

The analysis tested the impacts of an Ohio River System uniform operation and maintenance fee for all traffic on the system and a 70% recovery of the capital investment costs on all traffic traversing Lock 7 and/or Lock 8.

The results of this sensitivity analysis indicated that the selected plan would continue to attain the maximum net benefits. Therefore, the Administration's proposed cost recovery legislation would have no effect on the economic justification of the selected plan.

XI. RECOMMENDATIONS

I recommend that the plan to provide a new lock, with chamber dimensions of 84 x 720 feet, and a new fixed crest dam, 576 feet in length, on the Monongahela River at Grays Landing, Pennsylvania (r.m. 82.2), to be named Grays Landing Lock and Dam; and a new lock, with chamber dimensions of 84 x 720 feet, landward of the existing lock on the Monongahela River at Lock 8 in Point Marion, Pennsylvania (r.m. 90.8), to be renamed Point Marion Lock and Dam; be authorized for implementation as Federal projects, with such modifications as, in the discretion of the Chief of Engineers, may be advisable. In addition, the commonality of commercial traffic through Locks 7 and 8 is such that replacement of both structures during the same time period is essential to maintain the existing and future benefit stream. I, therefore, recommend that these two replacement facilities be authorized as a single project. These recommendations are made in recognition of current administrative initiatives before Congress on specific policies for Federal participation in water resources development. On 19 May 1983, the Department of the Army, on behalf of the Administration, transmitted proposed legislation to Congress which would provide for recovery of 70 percent of costs assigned to commercial waterway transportation for construction, rehabilitation, replacement, operation, and maintenance for most inland waterways with authorized depths of 14 feet or less. If this proposal becomes law, Corps of Engineers' expenditures for the Grays Landing Lock and Dam and Point Marion Lock projects will be subject to recovery through user fees as set forth therein. The Secretary of the Army would be authorized to recover costs by imposition of ton-mile fees. Operation and maintenance costs would be recovered on a system-wide basis and future construction costs would be recovered on a segment-specific basis. Therefore, my recommendation for construction authorization of the Grays Landing Lock and Dam and Point Marion Lock projects is made subject to cost-sharing policies satisfactory to the President and the Congress.

The first cost of the Grays Landing Lock and Dam and Point Marion Lock projects for the recommended plan is currently estimated to be $161,700,000 with a related additional operation, maintenance, and replacement cost of $683,000 annually. This cost and recommendation for authorization does not include $3,300,000 for rehabilitation considered necessary for the existing Point Marion Dam. This work, while included in the overall recommended project economics will be accomplished under existing authorities.

John L. Richards
Lt Colonel, Corps of Engineers
District Engineer

[First endorsement]

ORDPD-N (Jan 84) 1st Ind
SUBJECT: Mononagela River Navigation System, Pennsylvania and West Virginia, Locks and Dams 7 and 8 Feasibility Study, Final Report

DA, Ohio River Division, Corps of Engineers, P.O. Box 1159, Cincinnati, OH 45201

TO: CDR USACE (DAEN-BR), Resident Member, Kingman Building, Ft. Belvoir, VA 22060

I concur in the recommendation of the District Engineer.

R. S. KEM
Brigadier General, USA
Commanding

SUPPLEMENT REPORT OF DISTRICT ENGINEER

SUPPLEMENT

TO THE

INTERIM REPORT

ON

LOCKS AND DAMS 7 AND 8

FEASIBILITY STUDY

MONONGAHELA RIVER NAVIGATION SYSTEM

SUPPLEMENT
TO THE
INTERIM REPORT
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM

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EXHIBIT

Letter	Title
A	LOCKS 7 AND 8, MONONGAHELA RIVER, TYPICAL SECTION, PLACEMENT OF ANCHORS, TEMPORARY AND PERMANENT STRUTS

SUPPLEMENT
TO THE
INTERIM REPORT
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM

SECTION I. INTRODUCTION

This SUPPLEMENT contains information that was developed in response to a request from the Board of Engineers for Rivers and Harbors (BERH) to consider additional plans that might be implemented to rehabilitate the existing locks and dams so as to provide for the continuation of existing navigation service. BERH also requested an evaluation of all plans (including rehabilitation) against a different base condition, which would prevail over the planning period in the absence of implementation of any plan to solve the structural deterioration and navigation problems at the existing Locks and Dams 7 and 8. BERH believes that this different base condition, used for plan formulation and the evaluation of each alternative plan's benefits and costs, is a more appropriate means of demonstrating the level of navigation service that should be provided at Locks and Dams 7 and

BERH also requested an alternative treatment of the economic costs associated with the impact of lock closure on the commercial users of this portion of the waterway system. This supplemental analysis, therefore, treats these impacts as "Other Direct Costs" for the various rehabilitation alternatives. This approach is in contrast to the MAIN REPORT'S consideration of these costs as "Alleviated Closure Costs," and as such, a benefit for those alternative plans that do not require lock closure.

SECTION II. REHABILITATION

1. GENERAL

In determining the work required to rehabilitate Locks and Dams 7 and 8, an extensive condition investigation was conducted over several years, as documented in the MAIN REPORT. These studies concluded that:

a. Because of the original design, poor foundation conditions and foundation loadings, the existing lock walls and needle dam sills are unstable against both sliding and overturning criteria; and

b. Because of deteriorating concrete and long years of use and abuse, the internal or structural condition of these same major components is below acceptable standards for safe and dependable service.

Any delay in accomplishing rehabilitation would prolong what the condition analysis indicates is a considerable risk of failure.

In view of these conditions and the potential risks, the rehabilitation plans considered were all directed toward correcting the deficiencies in the minimum time frame.

2. LOCK CHAMBER CLOSURE IMPACTS

Because of the single lock chamber configuration at both Locks 7 and 8, the total costs associated with rehabilitation must include both the direct construction costs for the rehabilitation work and added uncompensated costs (Other Direct Costs) incurred during lock closure by those dependent on the waterway. Costs incurred during lock closure are sensitive to the length and frequency of closure. Data used to determine closure costs were obtained from studies and interviews conducted for this report and during other navigation rehabilitation investigations. The estimate of closure costs has been predicated on waterway users having sufficient lead time to define and implement their selected course of action during closure. For short duration closures, up to about three months, the "Other Direct Costs" would be comprised primarily of those additional costs associated with obtaining spot-marketed coal (readily available; relatively short lead time; no long term committment required; but at higher costs than long term contract coal) and the added costs associated with transporting and stockpiling coal and changing operating procedures to increase production at the mines and to reconfigure receiving procedures at the associated plants. If, however, the closure period actually experienced exceeds the planned closure period, the costs of coal production and transportation slowdowns due to the additional (unplanned) rescheduling and use of new sources would rapidly and dramatically increase.

For a closure projected to extend for approximately four months, or longer, the most likely industry approach would be to retain the use of existing sources of material, but temporarily shift tranportation modes. Shifting to new sources for such a period would require an excessively long lead time and considerable developmental investment, whereas with a temporary modal shift, the required temporary changes would be more cost effective. The temporary modal shift would involve the construction of transfer facilities, the rehabilitation and/or improvement of highways and railroads, the acquisition of additional transportation equipment, plus the operation and maintenance of these improvements, facilities and equipment.

Further, should a rehabilitation plan involving several closure periods be selected for implementation, the industry approach would be to devise an operational procedure that would cause the least increase to both plant and mine production costs, reduce the uncertainty of delivery, and at the least transportation cost. Additional details on the conceptual basis for estimating these "Other Direct Costs" resulting from the closure of Lock 7 or Lock 8 are delineated in APPENDIX H, pages H-5 through H-12. These general procedures were utilized in the development of closure costs (Other Direct Costs) for the closure periods of the various alternative rehabilitation plans evaluated in this SUPPLEMENT.

3. REQUIRED REHABILITATION

In view of the condition concerns discussed earlier and as noted in the MAIN REPORT, one objective in evaluating possible rehabilitation plans was to determine the extent to which each plan could return the locks and dams to a safe, dependable and engineeringly sound status. To facilitate both the analysis and evaluation, the construction work required to rehabilitate each project was aggregated into the following major groupings (Note that the work groupings and descriptions do not include all required items of work to completely rehabilitate a project. Emphasis was placed on those items of work which directly impact on traffic and which must be performed with the lock closed to traffic. Although other items could impact on lock operations or require short term lock closures, such impacts would be minimal, and the associated lock closure (if any) would be limited to periods of a few hours to two weeks):

- Stabilize lock wall monoliths. This necessary work is essential to permit the dewatering of the lock chamber to effect other repairs, and is needed for the long term to assure the safe, continued availability of Locks 7 and 8 to serve waterway transportation in this reach of the river.

- Reinforce deteriorated zones of concrete of the culvert walls which are subject to high bending and tensile stresses under lateral loading.

- Rebuild the guard sills of the lock. These sills support the needle dam closures required to dewater the lock chambers and are presently unstable. The sills would be rebuilt with deeper, more suitable foundations in accordance with current design criteria.

- Resurface and reface all lock walls, including the installation of armor on those vertical wall faces subject to severe barge impact and abrasion. This work is required to protect the remaining interior concrete (by removing deteriorated surface concrete and sealing with new concrete); to reinforce weakened sections to the maximum extent possible; to eliminate the sinking hazard to barges and boats that could "hang up" on the eroded, irregular wall surfaces during lock filling operations; to eliminate the safety hazards to personnel both on the walls and on tows and other vessels; and most importantly, to return the wall sections to their design configuration to reduce high internal stresses to the levels specified in current design criteria.

- Replace lock gates, lock gate operating equipment, lock gate anchorages, and lock gate miter sills. The lock gates and related lock gate appurtenances are critical features of a navigation installation. Constantly in use, subject to abuse and heavy loads, and difficult to maintain and repair because of their essential role (particularly at a single lock chamber installation), the use of the existing items has been stretched beyond their safe and effective limits. Consequently, their replacement and/or rebuilding are required for the assured and continued safe operation and availability of each facility.

- Repair the undercut areas beneath the lock walls. This work, to be done in the "dry," is essential to assure adequate base support for the repaired existing walls.

- Provide an emergency lock closure capability. This feature is required to assure safe and continued locking operations, prevent loss of pool, and would be in compliance with standards for new lock construction and major rehabilitation.

- Install floating mooring bitts. This work is necessary to assure safe and cost efficient locking operations for personnel of both the lock and the transiting vessels, and would be accomplished in compliance with standards for new lock construction and major rehabilitation.

- Replace culvert valves and culvert valve operating machinery. This work is necessary because with their constant use and essential role in a navigation installation, the valves, framework and machinery have become worn and weakened. Their replacement is required to assure the continued operation and availability of both locks.

- Construction of upper guide wall approach cells. This feature is required to better assist approaching tows entering the lock, particularl during high river flows.

- Replace mechanical and electrical system components. This work i required because the original components are old and deteriorated, and ar continually prone to failures causing lock outages or slowdowns in opera- tion. Replacement parts for these antiquated systems are not available a must be fabricated specifically for these sites.

- Upgrade power and lighting systems. This necessary work is needed to assure the safety of locking operations and the reliable availability Locks 7 and 8.

- Repair the undercut areas beneath existing Dam 7 and provide erosi protection downstream. Failure of the existing fixed crest dam and sub- sequent lengthy loss of pool would be critical to those relying on the river and its pool level. The repair of the undercut areas of the dam ar scour-proofing downstream of the existing apron would assure continued availability of Pool 7.

- Repair and stabilize the abutment of Dam 7. Loss of the abutment can also lead to loss of the pool; therefore, a stable abutment is vital a safe dam.

- Repair cracks around the service bridge seats on existing Dam 8 ar on the downstream face of the gate sills of the dam, repair the scoured areas below the fixed weir, and provide scour protection. This work is required to assure the continued safe operation of the gated dam and to protect the foundations of the dam from becoming undermined.

- Replace the abutment of Dam 8. This work is necessary to correct unsafe condition that could lead to failure, and would return the abutme section to compliance with stability criteria.

Early evaluations and assessments of associated construction costs to effect the complete implementation of all identified items of work at bo projects indicated construction costs in the range of 35 to 38 million dollars at each structure. Since the lock closure time required to perf those items of rehabilitation which interfere with traffic would be one the major considerations in evaluating proposed rehabilitation plans, al items of work that would impact on traffic were identified and assessed to the scope, implications, and dollar value of construction to determin their impact on the length of lock shutdown. The estimated dollar value these items amounted to about $24.0 million at each project with emergen closure facilities and approximately $19.0 million without the facilitie for emergency closure.

4. SEQUENCE OF CONSTRUCTION

A logical sequence of construction activities was then developed (using a network analysis approach) reflecting sequential constraints, best construction practices, and previous experience with similar work. Activity duration estimates were based on estimated quantities of individual work items, normal production rates used in estimating practice, and further corroborated by the actual experience of both the Pittsburgh District and other Corps Districts. It was also assumed that work during the closures would proceed around the clock, seven days a week.

With the preceding as a base, it was possible to review each project (which are similar) to determine the possible approaches to rehabilitation. It must be reemphasized, however, that rehabilitation is premised on the urgent need to correct the severe structural deterioration of the locks. In the District's view, the high risk of failure associated with this condition requires prudent action as quickly as it can reasonably be taken.

The inclusion of modern features (i.e. floating mooring bitts and an emergency closure) was given detailed consideration in the rehabilitation plans. The installation of floating mooring bitts is considered to be an appropriate and desirable addition to any rebuilding program. In addition to the obvious safety implications of their installation, considerable manpower savings can be expected. Adding floating mooring bitts does not add to the reconstruction time-line requiring lock chamber closure and the relative cost is not great. In view of this and the above discussed advantages, they have been included in all rehabilitation plans. This is not the case with the emergency closure facilities, however, since their inclusion in any of the rehabilitation plans adds to the length of closure required. For this reason, the time-lines developed (sequential activities) initially separated the emergency closure facilities from the remainder of the work.

5. REHABILITATION PLANS CONSIDERED

In determining the most appropriate and acceptable scheme for insuring the continuation of navigation service through the Locks 7 and 8 reach of the Monongahela River System, a number of alternative approaches were examined. These included the continuation of current activities (normal maintenance), major preventive maintenance, and several plans for major rehabilitation.

Since the major rehabilitation plans would require the single lock chambers to be closed to all traffic for extended periods to accomplish certain portions of the required work, single and multiple year chamber closures were evaluated. These evaluations were also made with and without an emergency lock closure system. The following paragraphs summarize these alternatives.

a. Normal Maintenance. This approach would provide for the continuation of navigation service for only the short term. It would involve maintenance and repair work on items that break down and would require short although unscheduled chamber closures. This approach would not address the major problems of marginal structural integrity and the deteriorating overall condition of these facilities, since it does not include the accomplishment of work requiring chamber dewatering. Yearly maintenance costs would increase under this plan and the navigation benefits would gradually decrease because of the diversion of traffic to more reliable transportation modes with the increasing frequency of short term closures. This plan carries a very high risk since the lock walls and gate sills do not meet stability criteria, and this condition would only worsen. The projects would be susceptible to accidental pool loss and structural failure because of the inability to repair those items requiring chamber dewatering. Should closedown due to failure occur (currently projected within 10 years), the costs of the unscheduled construction work and the impact from the lock closure would equal or exceed the cost of major rehabilitation. This approach, therefore, is not considered viable and was not considered further.

b. Significant Preventive Maintenance. This plan would be a modification of the previous (Normal Maintenance) plan where there would be a significant maintenance effort before something breaks (rather than waiting until after it breaks) and continuing until all accessible items (no chamber dewatering) have been replaced. The costs for this plan would be higher than the normal maintenance plan, and the benefits only slightly greater, while the risks would be the same. Consequently, as with the Normal Maintenance plan, this approach was not considered further.

c. Rehabilitation with Maximum Chamber Closure Time of 90 Days. In view of the obvious deficiency of the preceding maintenance plans, (i.e. the need for repair work requiring chamber dewatering), an attempt was made to devise a plan that would allow the correction of the major structural deficiencies while holding lock chamber closure to a 90 day period. Discussions with representatives of industry dependent on this portion of the Monongahela River, and an evaluation of potential users' costs that would be incurred during any closure period, as outlined previously in paragraph 2 of this Section, indicated that the maximum amount of time the locks could be closed without major disruptions to industry and high economic costs would be on the order of 90 days. Costs for closure times in excess of this time period would very quickly escalate to an exceedingly high level. The 90-day period was, therefore, selected as the most appropriate closure time allowing a meaningful amount of work to be accomplished while holding the impacts of closure to a tolerable level. The two major areas of work necessary to return the locks to an acceptable condition include stabilizing the lock walls and needle dam sills to facilitate future chamber dewatering, and the reconstruction of the lock miter gate monoliths. An initial effort to strut the chamber walls and stabilizing the needle dam sills would require about 2½ months to accomplish. This work would fit into the 90-day time limit. However, reconstruction of the miter gate monoliths would require a minimum closure of 4½ months. Since this would exceed the 90-day limit, it could not be accomplished. Therefore, rehabilitation could not proceed and this plan was eliminated from further consideration.

d. Alternative A-1; Two Phases (Without Emergency Closure). TABLE summarizes the sequencing and duration of those work efforts necessary to effect the rehabilitation of the lock (Lock 8 illustrated, Lock 7 is similar). The rationale and specific logic of this approach are as follows:

TABLE 1

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
REHABILITATION
ALTERNATIVE A-1
TWO PHASES (WITHOUT EMERGENCY CLOSURE)
(OCTOBER 1983 COST LEVEL)

Work Item	Estimated Cost/Lock and Dam	Closedown Duration	$ Value of Construction/Month
ITEMS TO BE ACCOMPLISHED DURING CLOSURE	$24,800,000		
Phase I	($ 4,400,000)	2 - 3 Months	$2,200,000 - $1,500,000
Minimum Improvements to Permit Safe Dewatering of Chambers			
Anchor Lock Walls (Prior to lock closure)			
Install Temporary Lateral Support (Struts)			
Construct Cofferdam Type Closures			
Construct Permanent Lateral Support			
Rebuild Needle Dam Sills			
Phase II	($20,400,000)	6 - 7 Months	$3,400,000 - $2,900,000
Install Needle Dams			
Rebuild Parts of Gate Monoliths			
Rebuild Lock Sills			
Reface and/or Rebuild Sections of Lock Walls			
Reface Guard and Guide Walls			
REMAINING ITEMS TO COMPLETE REHABILITATION EFFORT	$16,300,000		
Construct New Operations Building			
Resurface Top of Lock Walls			
Repair Undercutting of Lock Walls			
Install Lock Hydraulic/Electrical System			
Construct Cofferdam Closure (Dam)			
Replace/Repair Abutment			
Repair Apron and Sill of Dam			
Replace Electrical System for the Dam (Dam 8 only)			

Phase I

Because of the instability of the lock structure, the walls must be stab
lized, and the needle dam sills must be reconstructed. As shown by
EXHIBIT A, vertical anchors can be placed without a lock shutdown to red
the overturning problem. However, the correction of the sliding instabi
ity problem would require dewatering and the construction of horizontal
struts in the bottom of the chamber. To dewater, a cellular-type coffer
would first be constructed upstream and downstream of the locks. Then,
with lower pool in the chamber, the walls would be temporarily strutted
the waterline for the length of the chamber to support each monolith.

- The chamber would then be dewatered;

- The undercut areas beneath the lock walls would be repaired;

- The needle dam sills would be rebuilt on stable foundations and t
stable configuration, and the needle dam sill surfaces and coffer beam
recesses would be repaired and reinforced;

- The permanent struts in the floor of the lock chamber would be
constructed;

- The lock chamber floor would be paved;

- The dewatering cofferdam would be removed.

The minimum time to accomplish the above is estimated at two to three
months.

Phase II

Because of the condition of the lock structure and its high internal
stresses, Phase II should proceed the year after Phase I to avoid a
continuing high risk of failure (it should be noted that the anchors and
struts of Phase I could redistribute internal stresses sufficiently to
to the risk of structural failure).

- Using the reconstructed guard sills, needle dams would be erecte

- The chamber would be dewatered (Note: No temporary strutting wo
now be required.);

- All lock wall monolith rebuilding and reinforcing, lock gate and
lock gate machinery anchorages, lock wall facings, and gate sill rebuil
or repairs, would be completed; although not within the chamber, during
lock closure, the guard and guide walls would be refaced;

- After flooding the chamber, the needle dams would be removed.

The minimum time to complete the above is estimated at six to seven months.

The above shutdown durations, although long, are considered reasonable, even with the high risk associated with scheduling $2.9 to $3.4 million per month of construction placement.

e. Alternative A-2; Three Phases (Without Emergency Closure). Because of the significant impacts to users of the river from a lengthy lock closure, variations to Alternative A-1 were evaluated to assess the work distribution opportunities, risks, and costs of potential timesaving measures. Employing a three-phase construction sequence is one such approach, as shown on TABLE 2, and as discussed in the following:

Phase I

The effort, time, and cost of this phase of the work would be the same as described for Phase I of Alternative A-1.

Phase II

With the correction of the stability deficiencies during Phase I, it is then possible to more quickly dewater the chamber to perform further rehabilitation work oriented toward correcting the high internal stress and cracking problems. As noted for Alternative A-1, because of the high risks of failure associated with prolonging completion of rehabilitation, Phases II and III of this alternative should also be completed in successive years. While a large number of possible combinations of work items is possible, one activity controls the minimum closure time for this phase of the work. It involves the removal, reinforcing, and partial rebuilding of one set of miter gate monoliths and the associated gate sill, and the replacement and fit-up of the gates and gate operating machinery. This work requires a minimum of 4-1/2 months to complete. Thus, a likely and reasonable listing of work to be accomplished in the 4-1/2 month Phase II would be as follows:

- Erect needle dams and dewater chamber.

- Remove miter gates and related machinery.

- Remove concrete from one set of miter gate monoliths and miter sill.

- Reinforce and replace concrete in miter gate monoliths. Rebuild miter sill.

- Replace miter gates, gate operating machinery and fit-up and adjust.

- Flood chamber and remove needle dams.

TABLE 2

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
REHABILITATION
ALTERNATIVE A-2
THREE PHASES (WITHOUT EMERGENCY CLOSURE)
(OCTOBER 1983 COST LEVEL)

Work Item	Estimated Cost/Lock and Dam	Closedown Duration	$ Value of Construction/Month
ITEMS TO BE ACCOMPLISHED DURING CLOSURE	$27,400,000		
Phase I	($ 4,400,000)	2 - 3 Months	$2,200,000 - $1,500,000
Minimum Improvements to Permit Safe Dewatering of Chambers			
Anchor Lock Walls (Prior to lock closure)			
Install Temporary Lateral Support (Struts)			
Construct Cofferdam Type Closures			
Construct Permanent Lateral Support			
Rebuild Needle Dam Sills			
Phase II	($11,500,000)	4 - 5 Months	$2,900,000 - $2,300,000
Install Needle Dams			
Rebuild Upper Gate Monoliths			
Rebuild Upper Lock Sill			
Reface and/or Rebuild Sections of Lock Walls			
Reface Guard and Guide Walls			
Phase III			
Install Needle Dams	($11,500,000)	4 - 5 Months	$2,900,000 - $2,300,000
Rebuild Lower Gate Monoliths			
Rebuild Lower Lock Sill			
Reface and/or Rebuild Remaining Section of Lock Walls			
Reface Guard and Guide Walls			
REMAINING ITEMS TO COMPLETE REHABILITATION EFFORT	$16,500,000		
Construct New Operations Building			
Resurface Top of Lock Walls			
Repair Undercutting of Lock Walls			
Install Lock Hydraulic/Electrical System			
Construct Cofferdam Closure (Dam)			
Replace/Repair Abutment			

Although the above items dictate the minimum closure of 4-1/2 months to complete the remainder of the rehabilitation in a reasonable fashion, additional work would be undertaken while completing the above. This would include:

- Removing the concrete from one-half of the lock wall monoliths and upper guide and guard walls; then reinforcing and refacing these monoliths to the design configuration.

Phase III

The remainder of the rehabilitation work would be completed in a third phase, with the duration controlled by the rehabilitation of the remaining miter gate monoliths and miter sill, and the replacement of the miter gates and the gate operating machinery. This duration would also require a minimum lock closure time of 4-1/2 months. During this period, all remaining work in the lock chamber and lower guide and guard walls would be completed. The work items and sequency of accomplishment would be similar to those in the first 4-1/2 month closure period.

f. Options Available for Phases II and/or III.

(1) Repair and reinforce a few monoliths at a time. This plan was discarded early as unreasonable. Restructuring of the gate monoliths and rebuilding the gate sills would govern the time, and the minimum duration of the lock closure to accomplish this work would be four to five months. Minimum protection of the completed work, and preparing the chamber for service would require additional temporary measures, with additional time and cost penalties after each of the several shutdowns. In addition, this option would severely increase the risk of failure, and the risk of unexpected delays related to the method of construction, with an attendant increase in construction costs, and would offer only negligible total time savings at best.

(2) Repair one wall at a time. This option offers no time advantages, since work to repair, reinforce, and restructure the land wall would control, requiring six to seven months to complete.

(3) Repair one-half of the lock at a time. This option would introduce two subphases in repairing the lock chamber and is the basis for Alternative A-2. The duration for each phase of shutdown is estimated at about four to five months, since the gate sills and gate monolith work would govern. The limited time savings for each phase would not justify the two shutdowns and the increase in total economic costs, nor does it warrant acceptance of other serious technical considerations. For instance, concrete removal in the first phase would have to be accomplished more carefully and would require greater time and cost. Moreover, such an

effort carries a risk of propagation that could require the work to be extended or require a reduced level of use of the lock between the two phases of work. The available work areas would be severely restricted, and conducive to time inefficiency, since it is not practical to repair alternate monoliths. Temporary "transitions" between the rebuilt surfaces and those eroded would have to be constructed. The new work would be subject to damage at the ends, even with "transitions," and as noted, could reduce operational efficiencies of the lock. More critical than any of the above considerations, however, is the severe increase in risk with the incomplete reaches of the walls. These reaches would have been exposed to the severe dewatering loading, to the blasting for the removal of the other monoliths, and to normal construction activity abuse. In addition, the repairing, reinforcing and restructuring work in the initial monoliths could reveal conditions which are prevalent to other monoliths and requiring immediate attention. Thus, in addition to substantial increases in construction costs due to phasing, estimated to be in the range of 20 to 25 percent, breaking up the work in the chamber into two or more phases would extend the considerable risk of failure and is not a recommended option from a technical viewpoint.

(4) Use precast concrete panels to reface the walls. Careful consideration was given to this potentially timesaving option. However, this plan presents many technically objectionable considerations which make it wholly unacceptable. The potential time-saving itself is very uncertain. The work would require a large number of unlike panels due to the multitude of vertical features required in a lock chamber, such as ladders, line hooks, recesses, monolith joints, provision of wall armor, and the gate recesses. Panels would have to be positioned, adjusted, then anchored to the walls. Anchorage would impose severe demands on time. Eventually, the panel perimeter would have to be sealed to permit grouting of the panel to the wall. These operations are all time consuming. Anchorage of panels for line hooks, which require a 130 kip load design, would cause serious problems and would most likely require a special structural steel assembly and further panelization or cast-in-place concreting. The suitability of precast panels is highly questioned for lock wall application. Experience has shown that joints are the first items to fail. Introduction of a multiplicity of joints would jeopardize durability and increase maintenance costs. Of additional consideration is that more than one-half of the height of refacing in the land wall involves reconstruction of the wall itself, and extensive reconstruction is needed at the gate monoliths. Therefore, is not considered to be technically reasonable to use precast panels for only a portion of the refacing needs. By far, the most serious objection to the use of precast panels is the need to reinforce the lock walls to resist structural stresses. This consideration is particularly critical in the thin wall of the lock culverts. Appropriately anchored, reinforced structural concrete refacing can be used to reinforce these weak areas by working integrally with the wall, whereas the panels cannot meet this vital requirement.

(5) Stretch construction out over an extended period. A careful examination was made of the potential advantages of stretching out the rehabilitation program over a longer time period than three years. Some savings might result from this approach, particularly in view of the rather high closure impact costs and the possibility that industry might be able to utilize the time between closure periods to facilitate recovery and to prepare for the subsequent closure. An alternative to Plan A-2 was, therefore, examined that would allow one full year of no chamber-closing work between the closure periods. This would stretch out the total work period from three years to five years. The analysis of this approach, however, indicated no advantages and actually resulted in higher total costs. Industry's response to multiple year closures would probably be to prepare for the longest closure period, in this case 4-1/2 months. Therefore, nothing would be gained by scheduling a year between closures, since the investments would have been made and the shifts and changes in scheduling would still be required during closure. In addition, since the overall impact would extend over a longer period of time (five years vs three years), the impact costs would probably be higher. Further, with the lengthening of construction (five years vs three years), interest during construction would increase, and the economic cost of such a plan would be greater than for Plan A-2. Most importantly, however, is that stretching out the rehabilitation work in this fashion would continue the high risk of failure discussed previously. Therefore, this approach was not considered further.

g. Alternative A-3, Single Phase (Without Emergency Closure). From the preceding discussions on phasing and considering all the related opportunities, impacts and risks, a next logical alternative would involve accomplishing all rehabilitation work using a single lock closure period. The lock shutdown duration for such an approach was estimated to be 7-1/2 to 8-1/2 months and included a normal allowance for nonproductive time due to weather and river conditions. The advantages of this plan, outlined in TABLE 3, are as follows:

(1) Construction costs would be minimized. Efficient planning and scheduling of work would be available and would allow concurrent activities over the larger work areas.

(2) Disruption of traffic would be limited to a single shutdown, although for a longer duration than for the other plans.

(3) A major advantage results in the reduction of the risk of failure to an engineeringly tolerable level. With a single shutdown, all critical areas of concern can be addressed and corrected in a logical prioritizable sequence independent of time restraints. "Suprises" and unknown adverse conditions can be addressed and resolved in the broader overall scheme of urgency and logical sequence, with the tendency to increase time due to unforeseen problems, being amenable to redistribution and, therefore, offset by gains and savings in other activities. In summary, the totality of the needed work can best be addressed in one continuous operation; and the further weakening and damage induced by construction activities would not increase the risk of failure of the unfinished work between stages.

TABLE 3

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
REHABILITATION
ALTERNATIVE A-3
SINGLE PHASE (WITHOUT EMERGENCY CLOSURE)
(OCTOBER 1983 COST LEVEL)

Work Item	Estimated Cost/Lock and Dam	Closedown Duration	$ Value of Construction/Month
ITEMS TO BE ACCOMPLISHED DURING CLOSURE	$19,000,000		
Anchor Lock Walls (Prior to lock closure) Install Temporary Lateral Support (Struts) Construction of Cofferdam Type Closures Construct Permanent Lateral Support Rebuild Needle Dam Sills Rebuild Gate Monoliths Rebuild Lock Sills Reface and/or Rebuild Sections of Lock Walls Reface Guard and Guide Walls	($19,000,000)	7½ - 8½ Months	$2,500,000 - $2,200,000
REMAINING ITEMS TO COMPLETE REHABILITATION EFFORT	$16,040,000		
Construct New Operations Building Resurface Top of Lock Walls Repair Undercutting of Lock Walls Install Lock Hydraulic/Electrical System Construct Cofferdam Closure (Dam) Replace/Repair Abutment			

h. Alternative B (With Emergency Closure). The options discussed previously and generally designated as "Alternative A - Without Emergency Closure," would result in a rehabilitated facility lacking a very desirable and normally provided feature common to all modern navigation locks. This feature, an emergency lock closure, is recommended and mandated as a matter of policy and incorporated in all Corps guidance for new construction. The need and justification for this feature is predicated on considerations of safety and operational efficiency. Considerable concern has been expressed in recent years about the severe economic and environmental costs associated with the sudden loss of pool. Water intakes cannot function, electric generating facilities must shutdown, and riverbank failures occur which, in turn, cause the failure of highways, railways, sewers and any other structures located near the river. In addition, floating plants are often grounded and severely damaged and the flow of commerce on the inland navigation system is disrupted.

Locks 7 and 8 are particularly susceptible to the loss of pool due to an accidental ramming of the miter gates by tows entering the chamber. The basic problem is related to the limited depth of water over the lower sill (ten feet) and in the lock chamber. The difficulties this condition causes users of the lock are well documented in technical literature. Such an accident has already occurred at Lock 8. An upbound tow struck both upper gates knocking them off the pintles, resulting in the loss of pool. Accordingly, it is believed that emergency closure facilities should be provided for bulkheading the chamber upstream of the upper gates. Such a structure would furnish a quick closure dam in case of failure of the lock gates. A secondary benefit of such a feature is that it would facilitate normal maintenance requiring a dewatered lock chamber.

With this added feature, shutdown durations, construction costs, impact cost, and risk considerations were also evaluated for several alternatives. The possible phasing of the work in stages was considered in the same manner as described previously for Alternative A. Considerations, constraints, risks and conclusions are parallel and generally identical as for Alternative A. Construction costs are, of course, increased to cover these additional items. Lock shutdown durations are estimated as follows:

(1) Alternative B-1, Two Phases. (See TABLE 4)

(a) Phase I. Stabilize lock structure and construct emergency closure - 5 to 6 months.

(b) Phase II. Complete lock rehabilitation - 6 to 7 months.

(2) Alternative B-2, Single Phase. (See TABLE 5) Accomplish all lock closure work in one shutdown period - 10 months. This alternative is the same plan that was designated the Without Project Condition in the MAIN REPORT (reference pages 18 through 21), APPENDIX B (reference pages B-1 through B-37), and APPENDIX H (reference pages H-4 through H-12).

TABLE 4

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
REHABILITATION
ALTERNATIVE B-1
TWO PHASES (WITH EMERGENCY CLOSURE)
(OCTOBER 1983 COST LEVEL)

Work Item	Estimated Cost/Lock and Dam	Closedown Duration	$ Value of Construction/Month
ITEMS TO BE ACCOMPLISHED DURING CLOSURE	$30,000,000		
Phase I	($ 9,500,000)	5 - 6 Months	$1,900,000 - 1,600,000
Anchor Lock Walls (Prior to lock closure)			
Install Temporary Lateral Support (Struts)			
Construct Cofferdam Type Closures			
Construct Permanent Lateral Support			
Rebuild Needle Dam Sills			
Construct Emergency Closure			
Phase II	($20,500,000)	6 - 7 Months	$3,400,000 - $2,900,000
Install Needle Dams			
Rebuild Parts of Gate Monoliths			
Rebuild Lock Sills			
Reface and/or Rebuild Sections of Lock Walls			
Reface Guard and Guide Walls			
REMAINING ITEMS TO COMPLETE REHABILITATION EFFORT	$16,300,000		
Construct New Operations Building			
Resurface Top of Lock Walls			
Repair Undercutting of Lock Walls			
Install Lock Hydraulic/Electrical System			
Construct Cofferdam Closure (Dam)			
Replace/Repair Abutment			
Repair Apron and Sill of Dam			
Replace Electrical System for the Dam (Dam 8 only)			

TABLE 5

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
REHABILITATION
ALTERNATIVE M-2
SINGLE PHASE (WITH EMERGENCY CLOSURE)
(OCTOBER 1983 COST LEVEL)

Work Item	Estimated Cost/Lock and Dam	Closedown Duration	$ Value of Construction/Month
ITEMS TO BE ACCOMPLISHED DURING CLOSURE	$24,000,000		
Anchor Lock Walls (Prior to lock closure)			
Install Temporary Lateral Support (Struts)			
Construct Cofferdam Type Closures			
Construct Permanent Lateral Support			
Rebuild Needle Dam Sills	($24,000,000)	9½ - 10½ Months	$2,500,000 - $2,300,000
Construct Emergency Closure			
Rebuild Parts of Gate Monoliths			
Rebuild Lock Sills			
Reface and/or Rebuild Sections of Lock Walls			
Reface Guard and Guide Walls			
REMAINING ITEMS TO COMPLETE REHABILITATION EFFORT	$10,000,000		
Construct New Operations Building			
Resurface Top of Lock Walls			
Repair Undercutting of Lock Walls			
Install Lock Hydraulic/Electrical System			
Construct Cofferdam Closure (Dam)			
Replace/Repair Abutment			
Repair Apron and Sill of Dam			
Replace Electrical System for the Dam (Dam 8 only)			

62-511 0 - 86 - 5

6. SUMMARY

a. General. The preceding paragraphs have presented, in considerable detail, information on each of the plans considered. The following TABLE 6 provides a brief summary of these plans, an indication o their costs and benefits, their technical acceptability, and an indicatio of their associated risk.

b. Conclusions. The most technically acceptable plan from a condition viewpoint and at the least total cost (construction and other direc costs) would appear to be the single eight-month closure of Locks 7 and 8, without providing the emergency closure, (Alternative A-3).

If, however, the technical guidance and strongly stated operational policy has any validity, the inclusion of this modern facility must be considered The incremental cost of this feature, at approximately $5 million per project, would be at least equal to the incremental benefit to be realized from manpower savings, operational improvements to both the lock and the using industry, and safety. In addition, these same factors would justify the added other direct costs, on the order of $6.5 million per project, in the interest of obtaining a vastly superior, modern locking facility that is operationally commensurate with the state-of-the-art in both safety and functionability. The rehabilitation plan that includes emergency closure facilities, Alternative B-2, is the plan designated as the Without Project Condition in the MAIN REPORT.

TABLE 6

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
COMPARISON OF REHABILITATION PLANS
(OCTOBER 1983 COST LEVEL)

PLAN DESCRIPTION	LONG OR SHORT TERM	TECHNICAL ACCEPTANCE	CONSTRUCTION COST	CLOSURE TIME AND COST	NAVIGATION BENEFITS	RISK AND DISCUSSION
Normal Maintenance	Short term	Walls and sills would not meet stability criteria and condition would worsen.	Yearly maintenance costs would increase.	Short unscheduled closures until dewatering required. Then extended, unscheduled closure, estimated to be 6 months, would be required. Cost of extended closure in excess of $50 million per occurrence.	Level of service estimated to be 80 to 90% of complete rehab or $46 million A.A.B. until the first major closure. Traffic and benefits would decrease rapidly after such an event as shippers would shift to a more reliable mode.	High risks. Need to dewater, could occur periodically. Projects susceptible to accidental loss of pool and structural failure.
Significant Preventive Maintenance - (An option to "Normal Maintenance", but with a significant maintenance effort early in the process and continuing until all accessible items have been replaced).	Short term	Same as normal maintenance.	Costs would be higher than normal maintenance.	Short periodic closures until dewatering required; then same as normal maintenance.	Navigation benefits would be about $48 million until the first major closure. Traffic and benefits would decrease rapidly after such an event as shippers would shift to a more reliable mode.	Risk same as normal maintenance.

TABLE 6 (cont)

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
COMPARISON OF REHABILITATION PLANS
(OCTOBER 1983 COST LEVEL)

PLAN DESCRIPTION	LONG OR SHORT TERM	TECHNICAL ACCEPTANCE	CONSTRUCTION COST	CLOSURE TIME AND COST	NAVIGATION BENEFITS	RISK AND DISCUSSION
Rehabilitation with max. closure time of 90 days.	Repair of gate monoliths requires min. closure time of 4-1/2 months. Therefore, 90 day limit eliminates this plan as a long term solution.	90 day closures would provide time to make all repairs except miter gate monoliths.	Not evaluated.	Not evaluated.	Not evaluated.	High risk of structural failure would continue at an increasing rate.

TABLE 6 (cont)

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
COMPARISON OF REHABILITATION PLANS
(OCTOBER 1983 COST LEVEL)

PLAN DESCRIPTION	LONG OR SHORT TERM	TECHNICAL ACCEPTANCE	CONSTRUCTION COST	CLOSURE TIME AND COST	NAVIGATION BENEFITS	RISK AND DISCUSSION
Alternative A-1						
Rehabilitation without emergency closure facilities, using multiple closures of 2-1/2 months and 6-1/2 months.	Long term	Same as a single 8 month closure.	Approximately $41 million per lock.	2-1/2 months and 6-1/2 months; at approximately $5b million.	Approximately $55 million per year.	Risk associated with the condition of the structure would eventually be minimized. However, during the prolonged rehab period, the already high risk would continue and in some respects would be increased. The rehabilitated project would continue with the risk of a pool loss, because of the lack of an emergency closure.
Alternative A-2						
Rehabilitation without emergency closure facilities, using multiple closures of 2-1/2 months, 4-1/2 months and 4-1/2 months.	Long term	Same as a single 8 month closure.	Approximately $44 million per lock.	Approximately $72 million.	Approximately $55 million per year.	Same as above for the 2-closure scheme, except there would be more risk because of the longer duration of completing the rehab.

TABLE 6 (cont.)

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
COMPARISON OF REHABILITATION PLANS
(OCTOBER 1983 COST LEVEL)

PLAN DESCRIPTION	LONG OR SHORT TERM	TECHNICAL ACCEPTANCE	CONSTRUCTION COST	CLOSURE TIME AND COST	NAVIGATION BENEFITS	RISK AND DISCUSSION
Alternative A-3						
Rehabilitation without emergency closure facilities, using a single 8 month closure.	Long term	Stability problems would be corrected. Structural deterioration problem would be corrected. (Note: as long as "any" part of the original structure remains, there would not be a 100% certainty that the condition problem has been totally rectified.) Modern closure facilities would not be available.	Approximately $35 million per lock.	Approximately $60 million for an 8-month closure.	Approximately $55 million per year.	Risk associated with the condition of the structure would be minimized; however, the risk of pool loss, because of the lack of an emergency closure, would continue.

TABLE 6 (cont)

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
COMPARISON OF REHABILITATION PLANS
(OCTOBER 1983 COST LEVEL)

PLAN DESCRIPTION	LONG OR SHORT TERM	TECHNICAL ACCEPTANCE	CONSTRUCTION COST	CLOSURE TIME AND COST	NAVIGATION BENEFITS	RISK AND DISCUSSION
Alternative B-1						
Rehabilitation with emergency closure facilities, using multiple closures of 5-1/2 months and 6-1/2 months.	Long term	Same as a single 8 month closure.	Approximately $46 million per lock.	5-1/2 months and 6-1/2 months, at an approximate cost of $86 million.	Approximately $55 million per year.	Risk associated with pool loss would be minimized. Risk associated with structural condition would be the same as for a two closure period without emergency closure facilities.
Alternative B-2						
Rehabilitation with emergency closure facilities, using a single, 10-month closure.	Long term	Same as a single 8 month closure.	Approximately $40 million per lock.	10 months at an approximate cost of $73 million.	Approximately $55 million per year.	Risk associated with structural condition would be minimized. Risk due to loss of pool would be minimized.

SECTION III. ECONOMIC ANALYSIS

The economic analysis presented in this SECTION supplements the analysis contained in the MAIN REPORT and has been added at the request of BERH. It evaluates the most viable of the various plans considered against a base condition that would prevail over the planning period in the absence of implementation of any plan to solve the structural deterioration and navigation problems at the existing Locks and Dams 7 and 8. Several of the rehabilitation alternatives, as noted in SECTION II, were unacceptable because they either did not solve the problem or could proceed only at high risk; thus, they were not analyzed. Others merited further consideration and are included in the following discussion for comparative purposes.

They include:

a. Alternative A-1; Rehabilitation (without emergency closure facilities) in two phases of lock closure of 2½ and 6½ months;

b. Alternative A-2; Rehabilitation (without emergency closure facilities) in three phases of lock closure of 2½, 4½ and 4½ months. Because of the structural condition of both Locks 7 and 8 and the high risk of failure with an extended rehabilitation program, all analyses have proceeded on the basis of successive year construction.

c. Alternative A-3; Rehabilitation of Locks and Dams 7 and 8 (without emergency closure facilities) in a single, 8-month lock closure;

d. Alternative B-1; Rehabilitation (with emergency closure facilities) in two phases of lock closure of 5½ and 6½ months; and

e. Alternative B-2; Rehabilitation (with emergency closure facilities) in a single 10-month lock closure.

The benefits and costs for these alternatives were obtained in the same manner as for the previously detailed alternatives in the MAIN REPORT.

However, in the MAIN REPORT, the "Other Direct Costs" (or the economic cost of closure) are identified as "Alleviated Closure Costs", and are listed as a benefit for the replacement plans. In the following, such costs are identified as an economic cost for the rehabilitation alternatives. However, they are not included as a financial cost for the same alternative. The rationale for this alternative procedure is found in Section 2.12.7 of the Principles and Guidelines, dated 10 March 1983. This section recommends the inclusion in the economic cost analysis, of NED losses caused by the installation, operation, maintenance, or replacement of project or plan measures which are uncompensated net losses. Since the costs associated with lock closures, although borne by the waterway users, would be incurred as a direct result of a rehabilitation project, they are an appropriate element of the NED accounting process, to be listed as "Other Direct Costs."

The analysis of the alternative plans in the MAIN REPORT is based upon incremental costs and benefits in excess of the costs and benefits realized with a plan calling for a 10-month major rehabilitation with emergency closure facilities. For the following analysis, each rehabilitation scheme and replacement alternative is evaluated separately and then compared to determine the NED plan and the recommended plan. This total cost-total benefit analysis allows adequate measuring of all of the benefits that would be realized by the implementation of any of the alternatives and insures that any of the replacement alternatives receive full credit for all of the benefits that their implementation would provide. The results of this analysis are displayed in TABLE 7.

The NED plan (the plan which maximizes net benefits) as shown in TABLE 7 is the replacement of Lock and Dam 7 and Lock 8 with new facilities, to include new locks with dimensions of 84' x 720', at a first cost of $165 million. The average annual costs and benefits are estimated at $15.95 and $61.25 million, respectively, with a total net benefit of $45.30 million. The results of this analysis concur with the recommended plan of the MAIN REPORT.

TABLE 7

SUPPLEMENT TO THE INTERIM REPORT
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
MONONGAHELA RIVER NAVIGATION SYSTEM
TOTAL BENEFIT - TOTAL COST
ECONOMIC ANALYSIS
(OCTOBER 1983 COST LEVEL)

	Rehabilitation Without Emergency Closure			Rehabilitation With Emergency Closure								
	Staged Closure (2-1/2 & 6-1/2 Months)	Staged Closure (2-1/2, 4-1/2 & 4-1/2 Months)	Single 8-Month Lock Closure	Staged Closure (5-1/2 & 6-1/2 Months)	Single 10-Month Lock Closure	Replacement-in-kind (36' x 360')	Replace with Larger Lock (84' x 600')	Replace With Larger Lock (84' x 720')	Replace with Higher Lift Single Facility (36' x 360')	Replace with Higher Lift Single Facility (84' x 600')	Replace with Higher Lift Single Facility (84' x 720')
COST												
Total First Cost	$ 82,200,000	$ 87,800,000	$ 70,080,000	$ 92,400,000	$ 80,040,000	$144,220,000	$137,960,000	$145,080,000	$189,200,000	$191,290,000	$194,780,000
Total Investment 1/	88,950,000	102,410,000	72,870,000	99,700,000	83,360,000	148,100,000	176,050,000	184,180,000	234,941,000	237,608,000	242,209,000
Annual Investment	7,380,000	8,490,000	5,920,000	8,270,000	6,910,000	13,270,000	14,600,000	15,270,000	19,480,000	19,700,000	20,080,000
Other Direct Costs 2/	55,900,000	72,480,000	59,900,000	86,100,000	73,210,000	-	-	-	-	-	-
Annual Direct Costs	4,640,000	6,000,000	4,970,000	7,140,000	6,070,000	-	-	-	-	-	-
Annual Operation and Maintenance	950,000	950,000	950,000	950,000	950,000	740,000	710,000	680,000	400,000	380,000	380,000
Lake Lynn Power Loss 3/	-	-	-	-	-	-	-	-	840,000	840,000	840,000
Total Annual Cost 4/	$ 12,970,000	$ 15,440,000	$ 11,840,000	$ 16,360,000	$ 13,930,000	$ 14,010,000	$ 15,310,000	$ 15,950,000	$ 20,730,000	$ 20,920,000	$ 21,300,000
BENEFITS											
Navigation Benefits:											
Continuation of Existing Benefits 5/	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000
Additional Cost Reduction Benefits 6/	-	-	-	-	-	1,000,000	2,370,000	4,088,000	2,600,000	4,770,000	6,780,000
Shift of Mode 6/	-	-	-	-	-	-	-	790,000	-	-	780,000
Advanced Transportation System Adjustments 6/	-	-	-	-	-	50,000	50,000	50,000	550,000	550,000	550,000
Total Annual Benefits	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 54,500,000	$ 55,550,000	$ 57,120,000	$ 61,250,000	$ 57,650,000	$ 59,820,000	$ 62,650,000
ECONOMIC ANALYSIS											
Net Benefits	$ 41,530,000	$ 39,060,000	$ 42,660,000	$ 38,140,700	$ 40,570,000	$ 41,540,000	$ 41,810,000	$ 45,300,000	$ 36,920,000	$ 38,900,000	$ 41,170,000
BCR	4.2	3.5	4.6	3.3	3.9	4.0	3.7	3.8	2.8	2.9	2.9

1/ Includes interest during construction.
2/ Economic cost resulting from impacts of lock closure.
3/ Estimated value of loss of generation at Lake Lynn Power Station, owned by West Penn Power Company, because of loss of power head, as substantiated by their letter to LTC Ralph W. Gilbert, Jr., Deputy District Engineer, Pittsburgh District dated November 23, 1982.
4/ Annual charges were determined using an estimated economic life of 50 years and an interest rate of 8-1/8 percent.
5/ See Page 21a of the MAIN REPORT.
6/ See Pages 43-48 of the MAIN REPORT.

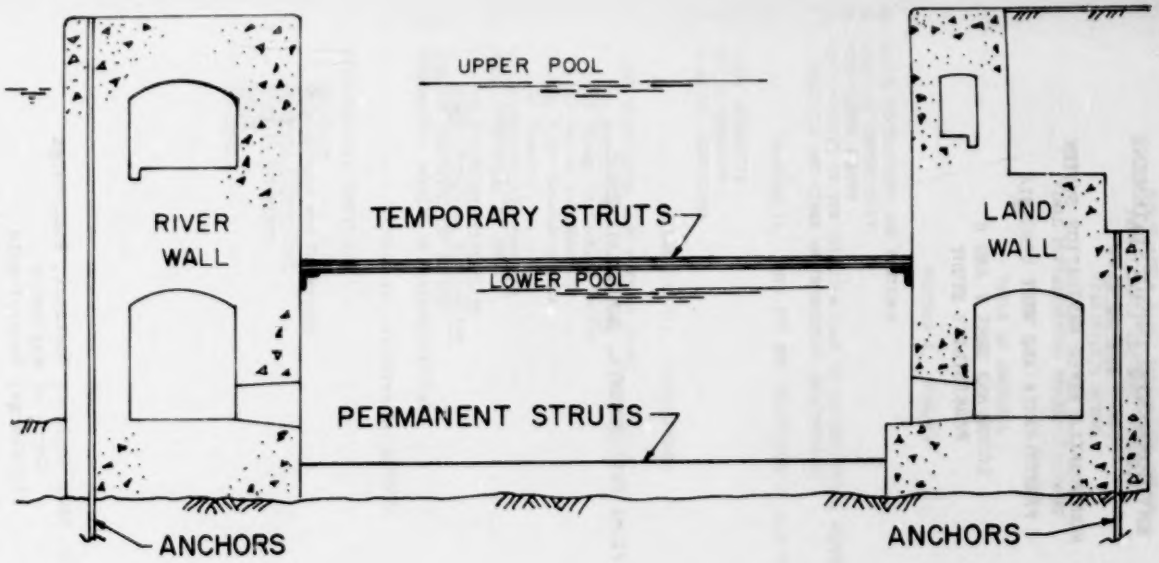

EXHIBIT A

SECTION

LOOKING UPSTREAM

SCALE 1" = 10'

ENVIRONMENTAL IMPACT STATEMENT

MONONGAHELA RIVER NAVIGATION SYSTEM

PENNSYLVANIA AND WEST VIRGINIA

LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

FINAL ENVIRONMENTAL IMPACT STATEMENT

U.S. Army Engineer District, Pittsburgh
Corps of Engineers
Pittsburgh, Pennsylvania

JANUARY 1984

MONONGAHELA RIVER NAVIGATION SYSTEM
PENNSYLVANIA AND WEST VIRGINIA
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

FINAL ENVIRONMENTAL IMPACT STATEMENT

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MONONGAHELA RIVER NAVIGATION SYSTEM
PENNSYLVANIA AND WEST VIRGINIA
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

FINAL ENVIRONMENTAL IMPACT STATEMENT

The agency responsible for the preparation of this EIS is the U.S. Army Engineer District, Pittsburgh, PA.

Abstract: Due to deterioration from age and use, Locks and Dams 7 and 8 require a major modification, either rehabilitation or replacement, to ensure the continued safe and economical operation of the Monongahela Riv Navigation System. The tentatively selected plan includes the replacement of Lock and Dam 7 by a new structure 2.8 miles downstream at Grays Landing PA and the construction of a new lock at Lock and Dam 8 landward of the present land chamber. Failure to provide these new structures could resul in a partial shutdown of the navigation system and cause serious economic hardship to user industries and the related economic infrastructure if the present structure(s) fail.

If you would like further
information on this statement,
please contact:
Mr. James Purdy
U.S. Army Engineer District, Pittsburgh
1000 Liberty Avenue
Pittsburgh, PA 15222
(412) 644-6844 FTS 722-6844

SECTION I. SUMMARY

1. MAJOR CONCLUSIONS AND FINDINGS

a. Replacing Lock and Dam 7 and Lock 8 with new facilities would ensure the continued operation of the Monongahela River Navigation System without the threat of a prolonged shutdown due to the potential failure of these lock and dam structures. Lock and Dam 7 and Lock 8 are both over 50 years old and because of age and deterioration through time and use, these structures could fail at any time.

b. Except for the no action alternative, any alternative selected would cause some environmental impacts. Water quality would be temporarily affected by increased turbidity and the suspension of bottom sediments generated during construction. There would be a loss of littoral zone due to pool raises and there would also be a loss of terrestrial habitat due to inundation and construction. Perhaps the most significant environmental impact that would occur, would be the inundation of recorded cultural/ archeological sites, some of which may be eligible for inclusion on the National Register of Historic Places.

c. Alternatives considered for this project include:

(1) Construction of a new lock at Lock and Dam 8 and replacement of Lock and Dam 7 with a new lock and dam at river mile 82.2.

(2) Replacement of Locks and Dams 7 and 8 with a single lock and dam at river mile 83.6.

(3) No action. This alternative requires the rehabilitation of the existing navigation structures since repairs are unavoidable and necessary to prevent failure.

2. AREAS OF CONTROVERSY

At the present time there are no known areas of controversy associated with this project.

3. UNRESOLVED ISSUES

The unresolved issues associated with this project are related to the proposed 2.8 mile pool raise between existing Lock and Dam 7 and the new Grays Landing Lock and Dam. Questions have been raised by the public concerning the effects that the pool raise and flooding would have on individual tracts, and the specific measures that the Federal Government would use to compensate the owner. The methods to be employed by the Government have been discussed with the public in general terms. Tract specific information is not available at this time. These unresolved issues would be addressed and resolved during the next phase of study.

RELATIONSHIP OF THE SELECTED PLAN TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

Federal Statutes	Compliance at Current Stage of Planning
Archeological and Historic Preservation Act, as amended, 16 U.S.C. 469, et. seq.	Full
Clean Air Act, as amended, 42 U.S.C. 1857 h-7, et. seq.	Full
*Clean Water Act of 1977, 33 U.S.C. 1251 et. seq.	Full
Coastal Zone Management Act, as amended, 16 U.S.C. 1451, et. seq.	N/A
Endangered Species Act, as amended, 16 U.S.C. 1531, et. seq.	Full
Estuary Protection Act, 16 U.S.C. 1221, et. seq.	N/A
Federal Water Project Recreation Act, as amended, 16 U.S.C 460-1(12), et. seq.	Full
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et. seq.	Full
Land and Water Conservation Fund Act, as amended, 16 U.S.C. 4601-11, et. seq.	Full
Marine Protection, Research and Sanctuaries Act, 33 U.S.C. 1401, et. seq.	N/A
National Historic Preservation Act, as amended, 16 U.S.C. 470a, et. seq.	Full
**National Environmental Policy Act, as amended, 42 U.S.C. 4321, et. seq.	Partial
Rivers and Harbors Act, 33 U.S.C. 401, et. seq.	Full
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et. seq.	N/A
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271 et. seq.	N/A

	Compliance at Current Stage of Planning
Executive Orders	
Executive Order 11988, Floodplain Management	Full
Executive Order 11990, Protection of Wetlands	Full
CEQ Memorandums	
"CEQ Memorandum, August 11, 1980, Analysis on Prime or Unique Agricultural Lands in Implementing NEPA"	Full
"CEQ Memorandum, August 10, 1980, Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory"	N/A
State and Local Policies	Full
Land Use Plans	Full

*In order to implement the requirements of Section 404 of the Clean Water Act, an exemption is being sought under Section 404(r) as part of the authorization process by including the Section 404(b)(1) evaluation in this EIS. The Corps has found that this project is in conformance with the 404(b)(1) guidelines.

**Compliance identified as "partial" until Record of Decision is signed by the Secretary of the Army.

SECTION II. NEED FOR AND OBJECTIVES OF ACTION

1. STUDY AUTHORITY

In May 1970, the Pittsburgh District completed a report recommending replacement of Lock and Dam 7 and Lock 8 with new facilities adequate to insure the continued movement of waterborne commerce on that portion of the Monongahela River Navigation System. After reviewing this report, the Ohio River Division Engineer, in August 1970, issued a Public Notice which set forth the recommendations of the Pittsburgh District Engineer and provided interested parties the opportunity to furnish additional information for consideration by the Board of Engineers for Rivers and Harbors in their review of the proposed action. In September 1970, the Board provided a favorable recommendation to the Chief of Engineers. After due consideration of the proposed improvements, the Chief of Engineers provided the Secretary of the Army with the following:

> "... I find that the entire replacement of Lock and Dam #7 and Lock #8 is essential to the efficient and economical operation of navigation on the Monongahela River, and that the proposed replacement will be in general conformance with similar works previously authorized by Congress. I recommend your concurrence and authorization of Grays Landing Lock and Dam and Point Marion Locks as approved by the Board of Engineers for Rivers and Harbors".

Prior to taking action on the recommendation by the Chief of Engineers, the Secretary of Army furnished his report recommending replacement to the Office of Management and Budget for consideration. No specific reservations were expressed by the Office of Management and Budget and in November 1973 the Secretary of the Army exercised the authority provided in Section 6 of the 1909 River and Harbor Act by approving the construction of replacements for Lock and Dam 7 and Lock 8 on the Monongahela River. However, in January 1977 the Secretary of the Army rescinded his authorization for construction of the two replacement projects and directed the documentation be prepared for submittal to the Congress for authorization if replacement actions were recommended. Study authority for the current feasibility report for submission to the Congress for construction authorization consideration was adopted by the House of Representatives by a resolution dated 23 September 1976.

2. PUBLIC CONCERNS

Public concerns expressed to date pertain to the effects that the project would have on the residents of Greensboro and New Geneva. These communities lie within the area of a required pool raise, and consequently, during the last public meeting (19 October 1983) questions were raised which concerned the pool raise, increased flood frequency and elevations and increased groundwater levels. Also, comments were made concerning potential impacts on residential and community sewers, sewer outfalls and drains, pasture land near Georges Creek, possible increased flood damages and future purchase of residential land in fee and for flood easements.

3. PLANNING OBJECTIVES.

The planning objectives established for the Locks and Dams 7 and 8 Feasibility Study encompass National, State and local views for alleviating problems and realizing opportunities associated with the Monongahela River Navigation System. This study is, however, limited to the extent that problem areas outside the range of a demonstrable relationship to Locks and Dams 7 and 8 are not addressed.

An examination of the existing problems and concerns of the study area indicate a need for more specific planning objectives. These criteria reflect not only the overall objectives established for the Locks and Dams 7 and 8 study, but also encompass national, state and local views, where possible, for alleviating problems and realizing opportunities. The specific objectives are as follows:

a. Estimate the commodities, their general origin and destination and the tonnage that is predicted to move on the Monongahela River and through Lock 7 and/or Lock 8 in future years.

b. Determine the present physical condition and capacity of existing Locks 7 and 8.

c. Determine the navigation problems imposed by channel geometry, projected traffic, projected navigation equipment and/or lock sizes.

d. Determine when and where lock delays are or would initially begin.

e. Determine when or if the traffic (when restricted by lock delays) would divert to other modes of transportation.

f. Determine the waterway improvements needed to meet the needs of commercial navigation.

g. Determine the hydropower potential of each facility.

h. Determine the effect (with waterway improvement) on shoreside facilities, riverbank stabilization, water-oriented recreation and water supply.

i. Preserve or enhance water quality, scenic areas and fish and wildlife habitat.

j. Avoid or mitigate increasing flood damages.

k. Determine the effect of changing waterway capacity (increase or decrease) on other modes of transportation.

SECTION III. ALTERNATIVES

1. PLANS ELIMINATED FROM FURTHER STUDY

The following discussion highlights those groups of alternatives which have been eliminated from further consideration:

a. Nonstructural Alternatives. The following group of alternatives utilized the locks and dams without major rehabilitation work of any kind.

(1) Change in Locking Policy (Ready-to-Serve) - Under this policy all lockages would be required to be single and self-powered. Fleeting areas, away from the lock chambers, would be provided in both the upstream and downstream pools and additional towboats provided to assume that each lockage operation would accommodate a group of barges and a towboat.

(2) Use of Switchboats - This measure would require the utilization of switchboats at both ends of each lock to remove the unpowered cuts of multiple cut tows locking through. The switchboat would then transport the barges to a point some distance from the lock site so as to avoid congestion and to facilitate the speedy chambering of the remainder of the tow which would be self-powered.

(3) Other Considerations - The scheduling of tow arrivals and the implementation of congestion fees were also considered as possible nonstructural measures that could increase the efficiency of the existing structures to process navigation traffic.

Tow arrival scheduling would be a solution that would require a great deal of imposition and costly coordination with the towing industry. Implementation, however, would be the most readily accomplishable nonstructural alternative, with the proper coordination, but a major problem would be the arrival timing of waterway movements over long distances.

The other possibility, implementation of congestion fees, would induce the marginal waterway user to leave the system as traffic congestion increased and, therefore, in turn reduce the level of demand for the waterway service and reduce the delay experienced by the remaining users.

(4) Summary - At the present time, Locks 7 and 8 have no significant congestion problems and associated delays. Although projections indicate increased delays as early as 1990, the implementation of nonstructural measures (while addressing delay problems) would not relieve the problem of overall condition and structural integrity. (See APPENDIX H of the MAIN REPORT for more detail on nonstructural alternatives.)

b. Structural Alternatives. Three iterations were completed during the study to determine which alternative would be the recommended plan. The first iteration studied the selection of possible individual replacement sites for Lock and Dam 7 and Lock and Dam 8 and also a single site to replace both structures., The sites considered during this first iteration included schemes with the locks located on both the right and left banks at river miles 82.2, 83.6, 85.0, 86.8, 88.0, 90.4 and 90.8. Also a lock riverward of the present Lock 7 was studied at river mile 85.0. Nine sites were eliminated during this iteration principally because of poor lock approach conditions, extensive relocations and excessive excavation that would be required to complete construction.

The following dam sites and lock locations were considered in the second iteration: river miles 82.2, right bank; 83.6, left bank; 85.0, riverward of present chamber (left bank); 86.8, left bank; 88.0, right bank; and 90.8, left bank. An examination of the economics of the above plans indicated that river mile 82.2 right bank, was a good candidate for the replacement of Lock and Dam 7; that constructing a new lock landward of Lock 8 would be feasible; and that a single structure at river mile 83.6 (left bank) to replace both Locks and Dams 7 and 8 was possible. These three plans were then studied in further detail in the third iteration. For a more in-depth analysis of the above iterations see APPENDIX H of the MAIN REPORT.

2. PLANS CONSIDERED IN DETAIL

a. Two Structure Alternative. This alternative, which is the tentatively selected plan, would consist of the construction of a new lock landward of existing Lock 8 and a new lock and dam at river mile 82.2 in the vicinity of Grays Landing, Pennsylvania, about 2.8 miles downstream from existing Lock and Dam 7. The proposed replacement locks would be 84 feet wide by 720 feet long. The dam at river mile 82.2 would be a fixed crest structure similar to existing Dam 7, with the lock located on the right (east) bank near the midpoint of a mile-long straight reach of the river. The existing Maxwell Pool at elevation 763 National Geodetic Vertical Datum (NGVD) would be shortened by 2.8 miles and the existing Pool 7 at elevation 778 NGVD would be extended downstream the same distance to the new dam. There would be no change in the pool elevations above existing Dams 7 and 8. Existing Lock and Dam 7 would then be removed. A profile from river mile 78 to river mile 82, which includes the project reach is shown on PLATE 2 of the MAIN REPORT. Dam 8 would remain in place and undergo modifications and rehabilitation. For a more detailed discussion of this alternative see APPENDIX H of the MAIN REPORT.

b. Single Structure Alternative. This alternative would consist of the construction of a new dam at river mile 83.6 with a new 84 foot wide by 720 foot long single lock on the left bank. The new pool would be at elevation 797 NGVD, the level of the existing Lock and Dam 8 pool. Locks and Dams 7 and 8 would then be removed. The Maxwell Pool in the 1.4 mile

distance between Lock and Dam 7 at river mile 85 and the new structure would be raised 34 feet and the Lock and Dam 7 pool would be raised 19 feet. Unlike the two structure alternative which would utilize a fixed crest dam, the single structure alternative would be gated to permit greater flexibility in controlling water elevations of the higher pool and to reduce backwater effects. This alternative could also include the installation of a hydropower unit.

The 19-foot raise in the pool level at Point Marion would raise the level of the tailwater in the Cheat River at the West Penn Power Company's Lake Lynn hydropower station. The resulting loss the in power head and related loss of power revenues would be a negative benefit attributable to this plan and, therefore, is included as a project cost.

Significant flowage damages and relocations would result in the 7.2 mile river reach from the new single replacement structure upstream to Lock and Dam 8, particularly in the communities of Greensboro, New Geneva and Point Marion, since the pool elevation would be one foot above flood damage stage. For additional detail see APPENDIX H of the MAIN REPORT.

3. WITHOUT CONDITION (NO ACTION)

This alternative considers the continued operation of both Lock and Dam 7 and Lock 8 based on the assumption that major rehabilitation of the structures would occur in the near future to extend their useful life an additional 50 years. Each structure was completed and put into operation in the fall of 1925. The present age and condition of each structure would require extensive repair, replacement, or major reconstruction to satisfy an additional 50-year life extension of their safe and economical use. Such rehabilitation of the locks would require almost complete rebuilding of each structure because of their deteriorated physical and mechanical conditions. The rehabilitation of both Locks 7 and 8 would require an interruption of navigation for a period of time of 10 months. Consequently, it would become necessary for industries that utilize the river to seek temporary, alternate modes of transportation and/or alternate suppliers to receive shipments. (See APPENDIX H of the MAIN REPORT for more details.)

4. COMPARATIVE IMPACTS OF ALTERNATIVE PLANS

EIS TABLE 1 is a summary of the significant environmental quality effects anticipated for each of the plans considered in detail. The significant resources are described in SECTION IV, while the impacts are described in SECTION V. For a comparison of social and economic impacts of the detailed plans see TABLE 16 of the MAIN REPORT.

EIS TABLE 1

NONCHCAMELA RIVER NAVIGATION SYSTEM
LOCK AND DAMS 7 AND 8 FEASIBILITY STUDY
SIGNIFICANT ENVIRONMENTAL QUALITY EFFECTS

Significant EQ Resources	Significant EQ Attributes	No Action[1] (Without Condition)	Candidate Plans: New L/D r.m. 82.1[2] New Lock at L/D 8	New L/D at r.m. 83.6[2] (Single Structure Alternative)
Water Quality	Ecological	No Effect	Slight Adverse Effect - Temporary increase in turbidity during construction. Some increases in thermal and dissolved oxygen stratification.	Adverse Effect - Temporary increase in turbidity during construction. Significant increases in thermal and dissolved oxygen stratification.
	Aesthetic	No Effect	No Effect	No Effect
	Cultural	No Effect	No Effect	No Effect
Aquatic Communities	Ecological	No Effect	Permanent Effect - Net loss of 36 acres of shallow water habitat. Would require 230,000 c.y. of dredging in immediate vicinity of new locks and dam. Minimized by standard engineering design practices.	Permanent Effect - Net loss of 38.9 acres of shallow water habitat. Would require 78,000 c.y. of dredging.
	Cultural	No Effect	No Effect	No Effect
Dam Tailwaters	Ecological	No Effect	No Effect	Adverse Effect - Net loss of one dam tailwater fishery.
	Cultural	No Effect	No Effect - Minimized by standard engineering design practices.	Adverse Effect - Net loss of one dam tailwater fishery.
Terrestrial Wildlife Habitat	Ecological	No Effect	Permanent Effect - Net loss of 112 acres due to construction and inundation, and disposal modification of 82 acres. Minimized by standard engineering design practices.	Permanent Effect - Net loss of 325 acres due to construction and inundation, and disposal modification of 82 acres.
	Aesthetic	No Effect	No Net Effect	Adverse Effect
	Cultural	No Effect	No Net Effect	Adverse Effect
Archeologic and Historic Resources	Cultural	No Effect	Adverse Effect - Potential loss of five sites.	Adverse Effect - Potential loss of 16 sites.

[1] This plan requires the rehabilitation to maintain structural integrity.

[2] The net EQ effects for these construction alternatives are not affected by lock size. The indicated net effect is identical for the alternative lock sizes described in the MAIN REPORT.

SECTION IV. AFFECTED ENVIRONMENT

1. ENVIRONMENTAL CONDITIONS

a. Location. The project area is located along the Monongahela River in southwestern Pennsylvania within Greene and Fayette Counties. Lock and Dam 8 is at river mile 90.8 near the town of Point Marion and Lock and Dam 7 is at river mile 85.0 at Greensboro.

b. Physiography and Topography. The topography of the area is very hilly as almost all of the land has been reduced to slope by erosion, with the entrenched sinuous Monongahela River valley being the prominent topographic feature. The general area is maturely dissected with well defined dendritic drainage patterns, and is characterized by an intricate network of narrow, steep-sided valleys and narrow, winding ridges. The only flat areas are narrow floodplains along the larger streams, particularly the Monongahela River, and a few flat-topped hills. Local relief varies from 400 to 500 feet along the Monongahela River to 200 to 300 feet along tributary streams.

c. Regional Climatology.[1/] The Allegheny Plateau in western Pennsylvania, which includes that area from Pittsburgh southward along the entire length of the Monongahela River, is considered to have a humid continental type of climate. With prevailing winds from the west, the Atlantic Ocean exerts only a slight influence on the climate of the region. Distinct physiographic features, however, often effect extremes of temperatures, rainfall and snowfall.

As is typical of continental climates, extreme temperatures are not uncommon. Annually, there is an average of eight days with temperatures equal to or greater than 90°F and five days with temperatures 0°F or below. The average annual temperature at Pittsburgh is 50.3°F.

Generally, rainfall and snowfall are heaviest in those areas with the most distinct physiographic relief. Rainfall and the water equivalent of melted snowfall range from approximately 36 inches annually near Pittsburgh to 42 inches near the West Virginia state line. Thunderstorms, which occur on an average of 35 days, annually account for the higher maximum 24-hour rainfall amounts observed in the warmer months.

[1/] Data from the National Oceanic and Atmospheric Administration office at the Greater Pittsburgh International Airport have been used to assess normal climatologic conditions.

d. Mineral Resources. Fossil fuels comprise the principal mineral resources within the Monongahela River drainage basin and include coal, oil and gas. The most extensive mineral fuel resource in the basin is bituminous coal with reserves estimated to be about 18.5 billion tons. Most of the present production comes from a small number of relatively thick coal seams, most of which have been extensively mined.

Production of oil and gas is derived from sandstone reservoirs. Within the Monongahela River drainage basin, gentle anticlinal folds have formed structural traps in which the oil and gas reserves collect. These structural traps closely control the location of the oil and gas fields throughout the central and western part of the basin. In the vicinity of the Monongahela River, most of the production is gas, while the principal oil producing reservoirs are located in the western part of the drainage basin, at some distance away from the river.

There are also nonmetallic mineral resources of economic value within the drainage basin. Limestone is mined for construction purposes (as structural stone or crushed stone), and for use as a raw ingredient for the production of cement, lime and blast furnace flux. Although some impure limestones are exposed along the Monongahela River, none possesses any outstanding physical or chemical properties leading to more than limited local development of these deposits. Sandstone is quarried locally throughout the basin and is used mostly for building stone, crushed aggregate, and as sand for glass, molding and silica refractories. Sand and gravel are also quarried locally for concrete aggregate, road base and glass sand.

e. Soils. The soils along the banks of the Monongahela River in the proposed project area, from Lock and Dam 8 downstream to the Grays Landing vicinity, are predominately silt loams that are derived from relatively nonacid alluvial deposits. The alluvial soils are found where floodplain and terrace development is well defined and are generally level or nearly level. Internal drainage varies between soil types and all have a slight erosion hazard.

Another group of river bank soils are those derived from colluvial materials, and generally considered upland soils. These are found where the valley walls come down to the river and floodplain-terrace development is not well defined. Parent material for these soils includes various combinations of shales, mudstone, siltstone, sandstone and limestone. These soil types occur on slopes that could vary from 15 to 80%. Internal drainage is generally not a problem with any of these soils, however, they exhibit a moderate to severe erosion hazard.

f. Wetlands. Three small palustrine emergent wetlands, totalling 1.71 acres, are located upstream of Lock and Dam 8 on the left bank. These wetlands are vegetated by species such as buttonbush, umbrella sedge and spike rush. One of the wetlands is severely degraded by acid mine drainage

and is not considered valuable habitat. Of the two remaining wetlands, one is primarily a monoculture of cattails, also slightly affected by acid mine drainage, and the other is a drier scrub-shrub type wetland supporting a more diverse vegetative community. Although this last wetland is of high habitat value, its extremely small size, when compared with all project affected lands, makes it a minor habitat component in the overall evaluation of terrestrial resources. Consequently, these wetlands do not receive further specific consideration in this report.

g. Groundwater Resources. The alluvial aquifer along the Monongahela River exists as a narrow band very close to the river channel. Its waters are generally soft, low in both hardness and chloride, but high in iron. Local anomalies usually occur where the alluvium is overlain by slag dumps which release large quantities of calcium, sulfate or other chemical substances into the groundwater.

Groundwater from bedrock aquifers occurs in shales, sandstones, limestones and local beds of coal. Normally it is moderately hard and locally high in iron. Major sandstone aquifers usually provide the best quality groundwater except for objectionably high concentrations of iron. Groundwater from shale is generally higher in hardness and dissolved solids.

h. Surface Water Resources.

(1) Monongahela River Drainage Basin - The Monongahela River drains 7,386 square miles in northern West Virginia, southwestern Pennsylvania and northwestern Maryland. The basin, including major tributaries, is shown on PLATE 1 of the MAIN REPORT. The river is formed by the junction of the West Fork and Tygart Valley Rivers at the head of slackwater navigation improvement, in Fairmont, West Virginia. From Fairmont, the Monongahela River flows in a northernly direction for about 129 miles before joining the Allegheny River at Pittsburgh to form the Ohio River. Major tributaries entering the Monongahela River below Fairmont include the Cheat River, which enters the project reach about one mile below Lock and Dam 8, and the Youghiogheny River, which enters the Monongahela River about 16 miles upstream from its mouth.

(2) Proposed Project Reach - The drainage area of the Monongahela River upstream of Lock and Dam 8 is 2,715 square miles. Between Lock and Dam 8 and the Morgantown Lock and Dam located 11.2 miles upstream, the tributary drainage area is 130 square miles. The largest stream tributary to Pool 8 is Deckers Creek which drains 63 square miles, or about half of the local tributary area, and enters the river from the right bank near the head of the pool at Morgantown, West Virginia.

The drainage area of the Monongahela River upstream of the proposed Grays Landing Lock and Dam site is 4,459 square miles. The tributary area between the Grays Landing site, at river mile 82.2, and Lock and Dam 8,

about 8.6 miles upstream, is 1,744 square miles. The greatest tributary contribution to the main stream flow within the potential Grays Landing Pool comes from the Cheat River, with a drainage area of 1,423 square miles. The Cheat River enters the Monongahela River from the right bank at river mile 89.5, 7.3 miles upstream of the considered Grays Landing Lock and Dam site and 1.3 miles below Lock and Dam 8. Other lesser, though sizable, tributary streams also enter the river in this reach. The largest are Dunkard Creek, draining 233 square miles, and Georges Creek, draining 66.4 square miles.

(3) Streamflow - The natural discharges of the Monongahela River and its tributaries show a wide seasonal variation. The highest flows generally occur during the months of December through April when soils are saturated or frozen and most conducive to high runoff. However, it is possible for major floods to occur at any time of the year. Most of the floods during the winter/early spring period are the result of heavy, prolonged rainfall over large areas sometimes accompanied by snowmelt. Summer floods generally result from intense thunderstorm rainfall which may be very local in extent. Thunderstorm induced floods are most likely to occur in the smaller tributary drainages. Low flows occur each year, primarily during late summer and early fall (August, September and October). Flows during this period are generally very low for several consecutive days or considerably longer because of an almost total lack of surface runoff. As surface runoff ceases, the entire flow of unregulated streams is drawn from groundwater storage which is generally already at its lowest levels at this time of year.

Streamflow measurements have been made by the Pittsburgh Flood Commission, the U.S. Geological Survey and the Corps of Engineers along the Monongahela River and many of its tributaries beginning as early as the late 1800's and early 1900's. The maximum recorded flood flows at Dam 7 and Dam 8 have been 162,500 cubic feet per second (cfs) and 84,000 cfs, respectively. The minimum flows of record in the project reach occurred in the autumn of 1930 when flows of 8 cfs and 30 cfs, respectivley, were estimated for the Monongahela River upstream and downstream of the Cheat River.

Construction of the Corps of Engineers' Tygart Dam on the Tygart River in 1938 has significantly altered the streamflow characteristics of the Monongahela River throughout the project reach. Operation of this reservoir insures a minimum flow of 340 cfs at Lock and Dam 8 upstream of the Cheat River and a slightly higher minimum flow for the portion of the project reach below the Cheat River. In addition, reservoir impoundment of flood waters during major floods results in stage reductions of as much as six to eight feet in the project reach.

Lake Lynn, located on the Cheat River about four miles upstream from its mouth, is not capable of significantly modifying low or high flows in the project reach because of a very limited usable storage capacity of only about one-third of an inch of runoff from its upstream drainage area. Any streamflow regulation provided is incidental to its primary function of electrical power generation.

The average 7-consecutive-day, once-in-10-year low flow is a commonly accepted means of expressing the flow characteristics of a stream during critical low flow periods. Enforcement of water quality standards, in particular, is generally related to this flow condition. The estimated 7-day, 10-year low flow under current conditions of development is about 340 cfs or somewhat more upstream of the mouth of the Cheat River, and about 590 cfs at the Greensboro gage (Lock and Dam No. 7) below the mouth of the Cheat River.

(4) River Use - Currently, there are 11 commercial docks, two recreational boat launching ramps and three water intakes in the proposed project reach, river mile 82.2 to 90.8. The existing commercial docks are primarily used for coal transport and are associated with local coal mining operations. The launching ramps located at about river mile 89 on opposite river banks near the mouth of the Cheat River are currently abandoned. Two of the water intakes in the project reach are utilized for municipal water supplies and the third is used by a glass company. There are no active commercial recreational docks or launching ramps located in the project reach; however, a few small private recreation docks are within the study area along the river.

(5) Sedimentation - The predominant source of sediment in the Monongahela River basin is area-wide sheet erosion. Localized erosion and sloughing of streambanks, degradation of stream channels and floodplains, and gully formation represent lesser sources of sediment. Some of the sediment produced in upland areas through sheet and other forms of erosion is permanently trapped in major reservoirs upstream of the project reach. Other sediment is temporarily deposited on floodplains and in stream channels and represent future sources of sediment to the main river channel.

During low and intermediate flow conditions, which occur the vast majority of the time, the primary form of sediments from streams tributary to the project reach are fine sand, silt and clay-size particles supplied by sheet erosion resulting from immediate runoff and by channel erosion of bars and shoals formed during previous recessions of flood flows. Most of these fine soil particles are transported as suspended material by turbulent action, which is primarily influenced by the velocity of the flow, although small quantities of coarser grained particles (fine sand and larger) are transported as bed load. Typical suspended sediment concentrations of streams flowing into the project reach vary from less than 10 parts per million (ppm) under low flow conditions, to a range of 50 to several hundred ppm under intermediate flow conditions (flows typically occurring several times annually). During flood flow conditions, much higher flow velocities result in much greater transport of sediment in upstream watershed and tributary streams, both as suspended sediment and as bed load. Concentrations of suspended sediment flood flows can be on the order of thousands of ppm.

1. Socio-Economic Conditions. The socio-economic conditions of the project area are typical of southwest Pennsylvania communities along the Monongahela River. The project area is composed of many extremely small,

rural "patches" or villages all of which are unincorporated; only Greensboro, river mile 85.0 and Point Marion, river mile 90.0 are incorporated within the project reach. These villages, scattered throughout the area, developed primarily because of the coal mining industry which was the predominant employer. Many of the communities, such as Alicia at river mile 81.0, Grays Landing at river mile 82.2, Penn Pitt at river mile 85.0, and Poland Mines at river mile 87.0, still contain rows of identically constructed "company" homes that were built by coal companies near the mine portals and were originally used and later purchased primarily by coal miners. Due to the slack in the coal industry and other complex economic factors, the area is now somewhat economically depressed with high unemployment. The predominant industry in the area is still, however, coal mining with employment also in coal related industries such as coal transport and electrical power generation. For additional details see APPENDIX G of the MAIN REPORT.

2. SIGNIFICANT RESOURCES

a. Streamflow and Flooding. Flood flows for various recurrence intervals have been estimated for the Monongahela River for present conditions of development. EIS TABLE 2 following is a summarization of the estimated flood discharges in the project reach.

EIS TABLE 2

EXISTING FLOW STORAGE RELATIONSHIPS FOR SELECTED RECURRENCE INTERVALS

Recurrence Interval (years)	Lock and Dam 8 Flow (cfs)	Lock and Dam 8 River Stage Elevation (upper pool) (lower pool)	Lock and Dam 7 Flow (cfs)	Lock and Dam 7 River Stage Elevation (upper pool) (lower pool)
1	31,000	797.9 791.2	73,000	787.5 781.1
2	42,000	799.5 793.2	87,000	789.0 784.0
5	53,500	801.0 796.4	107,500	791.6 787.9
10	61,500	801.9 799.0	123,500	794.0 790.6
50	81,500	804.8 803.6	157,000	798.4 796.1
100	90,000	806.2 804.9	168,000	799.6 797.6

In the reach of the proposed Grays Landing Pool, significant flooding currently begins at a flow of 80,000 cfs, with extensive flooding occurring at 130,000 cfs.

Under existing conditions, including continued regulation by Tygart Lake, the computed frequency of damaging floods is once every 2 years in both the Point Marion vicinity and in the Greensboro-Glassworks-New Geneva vicinity. Average annual flood damages are estimated to be $68,000 in the Point Marion damage reach from river mile 89.8 to river mile 90.8, and $27,000 in the Greensboro-Glassworks-New Geneva damage reach from river mile 82.2 to river mile 85.0 (October 1983 values). EIS TABLE 3 shows the relationship of flood damages to selected river stages and frequencies through the project reach.

EIS TABLE 3

RIVER STAGE-FLOOD DAMAGE RELATIONSHIPS
FOR EXISTING RECURRENCE INTERVALS
(OCTOBER 1983 VALUES)

Recurrence Interval (years)	Point Marion River Stage Elevation (NGVD)	Point Marion Primary Damages	Greensboro-Glassworks-New Geneva River Stage Elevation (NGVD)	Greensboro-Glassworks-New Geneva Primary Damages
1	790.5	0	781.1	$ 7,500
2	792.5	$ 2,100	783.6	11,800
5	795.7	34,000	787.3	39,800
10	798.2	142,400	789.9	56,900
50	803.0	871,700	794.8	110,300
100	804.3	1,162,900	796.5	152,600

b. Water Quality. Acid mine drainage is the most serious water quality problem in the upper Monongahela River. Until recently, the entire Monongahela River mainstem was severely degraded by acid mine drainage from bituminous coal mining operations. Since about 1970, however, the water quality of the river has improved substantially. Violations of the Pennsylvania minimum pH criteria of 6.0 still occur, especially below the confluence of the acid polluted Cheat River, when flows in the Monongahela River are low. Since 1975 the mean pH at Greensboro has been 6.7 and the minimum detected pH at this location was 5.3. See EIS TABLE 4 below for pH levels at Lock and Dam 7.

EIS TABLE 4

pH LEVELS AT LOCK AND DAM 7
FOR SELECTED YEARS

Period	Number of Observations	pH Mean	pH Maximum	pH Minimum
1940	20	4.25	6.5	3.2
1966-68	11	4.26	6.7	3.1
1972-75	21	5.40	6.5	4.1

Another effect of acid mine drainage is the relatively high degree of mineralization of the Monongahela River at low flows. The mean total dissolved solids concentrations in the river at Greensboro since 1975 was 198 mg/l and the maximum value was 704 mg/l. The Pennsylvania Department of Environmental Resources (PADER) maintains records of Monongahela River water quality at Greensboro, river mile 85.0. EIS TABLE 5 below is a summary of PADER data retrieved from the STORET files for the period from January 1975 to February 1983.

EIS TABLE 5

WATER QUALITY AT GREENSBORO, PA
JANUARY 1975 TO FEBRUARY 1983

Parameter	No. of Observations	Maximum	Minimum	Mean
pH	78	8.0	5.3	6.7
Total Alkalinity (mg/l as $CaCO_3$)	75	120.0	0.0	16.5
Conductance (micromhos/cm^2)	76	730	160	284
Total Hardness (mg/l as $CaCO^3$)	78	281	38	106
Sulfate (mg/l)	79	317	42	102
Total Iron (mg/l)	76	11,000	130	1,470
Dissolved Solids (mg/l)	67	704	62	198

Resuspension of River Bottom Sediments - Commercial traffic on the river, as well as maintenance dredging activities, churn up the bottom sediments to some degree, putting them into suspension for movement downstream. These man-made influences affect and modify to varying degrees natural patterns of sediment suspension, transport and deposition. The magnitude of the effect depends on many things; such as flow, towboat power, channel depth, river width and frequency of use.

In 1980, the Pittsburgh District, Corps of Engineers initiated a river sediment elutriate analysis program. The object of the study was threefold: first, to determine background concentrations of priority pollutants in District waterways; second, to determine the potential for "worst case" river sediments to release priority pollutants to these waters during dredge and fill activities; and finally, to assess the biological effect of the sediment elutriate on representative aquatic organisms.

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Sediment and corresponding water samples were purposely collected from deposits of fine-grained silt in proximity to potential priority pollutant sources, thus representing the "worst case" sediment which might be encountered during dredging activities.

The elution procedures involved vigorous mixing of the sediment with eluting water collected at the sediment sampling site. Eluting water and the resulting sediment elutions were then analyzed for priority pollutants according to USEPA recommended methodology, and 96-hour static bioassays of the sediment elutriate were conducted under guidelines recommended by the joint EPA/COE Technical Committee on Criteria for Dredged and Fill Material.

Results from a chemical analysis of the elutriate and eluting water indicated that while a number of the priority pollutants, principally metals, were detected at each site in both the elutriate and river water, concentrations were generally at or near detection limits. Because of experimental difficulties, the results of several of the 96-hour static bioassays could not be statistically verified. Overall, however, the bioassay results suggest no elutriate toxicity to aquatic organisms.

Despite the "worst case" sampling procedure, vigorous sediment elution and the extent of the analytical effort, the "worst case" sediments showed little potential for release of priority pollutants or biologically toxic material. Though these results do not necessarily mean that substrates in local waterways are not polluted, this study does suggest that dredging the Pittsburgh District, including the Monongahela River in the study area, is generally not likely to result in biological toxicity or water quality degradation due to priority pollutant release. Therefore, unless there is site specific evidence or strong suspicions to the contrary, routine bioassay and elutriate analysis for all priority pollutants would prove to be an expensive and unnecessarily excessive requirement for dredging within the rivers in the Pittsburgh District.

c. Aquatic Communities.

(1) Phytoplankton - Phytoplankton samples were collected from the project area during two different flow regimes in the summer of 1975. The concentration of phytoplankton in the project area during the June intermediate flow (5,000 to 12,000 cfs) ranged from 321 to 631 cells/ml and averaged 436 cells/ml. The concentration and species composition of the intermediate flow samples were relatively uniform, but distinct biological zones became apparent during a July low flow (650 to 1,800 cfs) survey. At this time, a sudden decrease in concentration of phytoplankton and a sudden change in species composition were noted below the mouth of the acid mine drainage polluted Cheat River. Relatively low pH and alkalinity values were also recorded along the reach during the low flow survey and acid pollution probably was responsible for the localized decrease in phytoplankton concentrations.

The results of the low flow survey are summarized in TABLE 6 following. These results indicate that, at least at low flow, plankton productivity will be relatively low in most of the considered Grays Landing Pool, and the phytoplankton community will tend to be dominated by acid tolerant types.

EIS TABLE 6

RESULTS OF JULY 1975 LOW FLOW
(500 to 1,500 cfs) PHYTOPLANKTON SAMPLES

STATION LOCATION	TOTAL COUNT	% COMPOSITION OF DOMINANT TAXA		
river mile	total cells/ml	% bluegreen algae	Ankistrodesmus sp.	Scenedesmus quadricauda
90.9	3,822	2.9	54.6	40.8
90.7	4,155	2.9	49.9	43.3
85.1	980	0.9	88.0	0.3
84.9	2,110	15.2	81.5	0
81.5	1,396	3.1	92.5	0

(2) Aquatic Vascular Plants - A diversified aquatic macrophyte community was observed in the Monongahela River during the summer of 1975. A total of 20 species of aquatic plants were identified during the investigation. Among the macrophytes that were abundant and highly conspicuous were: burreed (Sparangium sp.), broadleaf arrowhead (Sagattaria latifolia), soft rush (Juncus effusus), and spikerush (Eleocharis sp.).

Burreed, which was observed growing in bands parallel to the river banks, were in relatively deep water (approximately six feet deep). In June, when the early underwater leaves of the burreed were limp and their growths dense and conspicuous, it was observed that these bands very efficiently contained the turbidity created near shore by wave action. Resuspended sediment in the shoal areas near the banks was largely trapped on the landward sides of the bands of burreed growth.

The remaining species of conspicuous plants mentioned earlier occur on soils from the point at which the water table is about 1.5 feet below the soil surface to where the sediment is covered with about 4.5 feet of water. Communities of these emergent macrophytes were most visible in late July on exposed mud flats in the Locks and Dam 3 and Lock and Dam 7 pools. Both of these pools are behind fixed crest dams which cannot regulate pool elevations during low and medium flows, and both are downstream of the mouth of

the Cheat River where daily water level fluctuations are significant due to the operation of the Lake Lynn hydroelectric power plant.

(3) Benthic Macroinvertebrates - Benthic macroinvertebrate studies performed in the Monongahela River during the mid to late 1960's indicated that the river only supported pollution tolerant organisms such as chironomid larvae and oligonchaete worms. Studies completed in 1975 continued to indicate that the benthic community was composed largely of pollution tolerant forms. Since 1975 water quality has improved; however, no recent benthic studies have been conducted. Therefore, it is not known whether there has been a corresponding increase in species diversity.

(4) Fishery Resources - The Monongahela River presently supports a diverse warmwater fishery which receives moderate to heavy fishing use in the Pennsylvania portion of the river. Recent lock chamber samplings with rotenone at the Maxwell Locks (river mile 61.2) have collected about two dozen fish species. More extensive sampling in the river, about 60 river miles downstream of the study area, during 1977-78 collected 46 species of fish and four hybrids. In all, 57 species of fish and several hybrids have been collected from the Pennsylvania portion of the Monongahela River since 1970. (See APPENDIX K of the MAIN REPORT for a list of species found in the area.)

Formerly, the waters of the Monongahela River were severely degraded by acid mine drainage in the upper reaches and industrial pollutants in the lower river. At that time the river supported only sparse populations of the most pollution tolerant forms of aquatic life. Gradual, but steady, improvements in river water quality through the 1960's contributed to dramatic increases in species diversity and biomass. This improvement was augmented by the Pennsylvania Fish Commission's stocking of several species of warmwater sport fish in the 1970's.

The Monongahela River has become a significant fishery resource in southwestern Pennsylvania and supports a level of fishing use not previously available in the region. Fishing is considered successful for walleye, largemouth and smallmouth bass, channel catfish and muskellunge. Walleye fishing success has greatly increased and reproduction appears to be occurring in the dam tailwaters, as discussed in APPENDIX K. Additionally, sauger has recently been found in the lower portion of the river and is expected to extend its range into the upper river as a successful fishery.

In spite of the improved water quality, however, the river remains subject to periodic significant pH depressions, probably associated with upland coal mining activity. Substantial fish kills resulting from pH depressions occurred in 1978 and in June 1983.

d. Terrestrial Communities.

(1) Vegetation - The vegetation found in the project area is typical of that commonly associated with the Monongahela River Valley. Combinations of both natural and manmade influences have created many

varieties of environmental conditions that support a wide range of vegetation. Although many natural factors, such as climate, aspect and soil characteristics have been instrumental in developing the various vegetation communities, man's intervention has also played an extremely important role. The majority of the forests in the area are second or third growth stands. Tracts of land that have been cleared are now used for pasture, croplands, cemteries and parks. There are also many abandoned fields in the area that are in various stages of ecological succession ranging from "old field" vegetation, predominantly grasses and forbs, to third growth woodlands. These changes, along with the influence of residential development and the coal industry, have all greatly modified the environment and its resultant vegetation.

In the study area, the species most commonly occurring along the riverbank slopes include the following: black willow, elm, alder, sycamore, silver maple, black locust and box elder. The trees that exhibited dominance were, in descending order, sycamore, black willow and silver maple. Although not highly distinguished, a gradual transition takes place between the bank slopes and the tops of banks. The bank top vegetation is usually more diversified and includes all of the above plus the following more mesic species: black cherry, sassafras, sumac, catalpa, buckeye, oaks, tree of heaven, red maple and hackberry.

In the study area there has been some severe vegetation disturbances by coal mining activities. These areas have been covered directly by coal or coal loading facilities, many of which have since been abandoned. Many of these areas are still barren today covered only by coal waste. Where vegetation in these areas has appeared, the most common types include various grasses and forbs and tree species, such as black locust, staghorn, smooth sumac and black cherry.

(2) Mammals - The species composition of the mammalian populations currently in the study area reflects the effects of man's past and present activities. Forest removal, community development, agriculture and coal mining have been the major factors determining the types and distribution of mammal habitats. The clearing of the habitats which, with the passage of time, changes in land use and ecological succession, produced many habitats for a variety of species. Low-lying shrubs, grassy areas, stands of young saplings and thickets are examples of area habitats used by various mammals. Community development has served to decrease the living area for many mammals, especially those sensitive to the presence of man. Agriculture keeps the land from growing back to its original forested state and maintains habitat, in the form of pasture, plowed fields, fence rows, etc. Coal mining has also produced environmental change. Structures such as tipples, conveyor belts and barge loading facilities and the deposition of waste in large dumps have decidely decreased available land for habitation. Strip mines, which are quite common in the project area, cause large-scale habitat destruction, and because it takes years for vegetation to reestablish in these areas, the habitat quality is severely reduced.

In spite of these problems, there are many diverse habitats available; however, the size of the more desirable areas is generally limited. Hence, the general area is not well suited for those species which require extensive acreage of uniform habitat. Species that are most successful are those which are able to tolerate smaller units and human activity. APPENDIX K of the MAIN REPORT lists those species likely to be found in the study area.

(3) Birds - The diversity of common bird species in the vicinity of the study area reflects the area's diversity of vegetation and land use. The more abundant habitat types are deciduous woods, primarily immature mixed oak types, active agriculture lands, abandoned farmlands and residential areas. These and other lesser abundant habitats are generally present in a diverse, irregular pattern of smaller units. In addition to the units of each habitat type, the particular distribution pattern of irregularly shaped, small units provides substantial ecotone areas which are usually of high habitat value. Abandoned farmlands are common in the project area and possess habitat characteristics and values similar to the more confined transitional ecotone areas between habitats. The diversity of vegetation forms associated with the abandoned farmlands is further increased by differences in their "age" since farming ceased. Consequently, the vegetation forms range from early old field, with predominately grass and low forbs to dense growths of tall forbs and thickets of shrubs and early invader tree species to early woodland stages. Bird species most favored in the vicinity are those with modest territory requirements and which prefer thickets, brushy area, old fields, fence rows, open fields, meadows, pastures, edges of wood and/or immature deciduous woods, and can tolerate some degree of human activity.

The other habitats in the area are those associated with rural and community residential areas. These include farmsteads, small rural communities, larger "suburban" type areas, parks and cemeteries, which provide habitat for those species which can tolerate a higher level of human activity. The birds associated with these habitats are generally the more commonly recognized species, and are rather abundant individually, but not very diverse collectively.

Coal mining has eliminated or greatly reduced habitat quality over large land areas for birds and other wildlife. Strip mining, as well as coal processing facilities, storage areas, disposal areas and transportation routes occupy substantial areas of otherwise potentially productive habitat. Additional habitat areas will be adversely affected in the future as coal mining continues. At best, these effects may be temporary over the long term.

The study area is of limited value to birds commonly associated with water. Factors which tend to reduce habitat quality in this regard are limited shallow water areas, limited exposed beaches or mud flats, water quality, absence of significant marshes or swamps and commercial and recreational

river traffic. These factors combine to reduce the numbers and variety of waterfowl, wading birds and shore birds which the area could support. However, the river is used as a resting area by waterfowl during migration, although it is not a major flyway (See APPENDIX K for species list.).

(4) Reptiles - Reptiles utilize a wide variety of habitats that range from mountainous areas to cities, and from shallow ponds to large permanent bodies of water. The study area provides a large assortment of habitats, such as those mentioned in previous discussions on birds and mammals.

Because most reptiles generally do not require extensive, uniform habitats and most of the species are able to tolerate some degree of human activity, the study area generally provides good habitat for many reptile species (See APPENDIX K for species list).

(5) Amphibians - The habitat requirements of amphibians are quite diverse. They are found in woodlands, caves, springs, rocky areas, rivers, lakes and urban settings to name a few. Although amphibians inhabit many different environmental settings, they all have one thing in common - an aquatic environment is a necessity during at least part of their life cycle. Consequently, amphibians are very sensitive to water quality. The chief industries in the basin, deep mining and strip mining, both significantly impact on water quality. As a result, untreated drainage or discharges near strip and deep mines have reduced the ability of many Monongahela River tributaries to support amphibians (See APPENDIX K for species list).

e. Aesthetic Characteristics. The landscape of the project area varies from valley flatland to steep hills, with relief averaging 400 to 500 feet from the valley floor to hilltop. The region is deeply dissected by steep-sided narrow valleys created by entrenched meanders. In adapting to the steep topography of the region, urban development has concentrated in the valleys and utilized upland areas as the demand for developable land increased from the pressure of urban industrialization. In rural areas, the landscape is generally characterized by second growth floodplain hardwoods along the banks, interspersed with open pasture and croplands along the banktops and on the hills overlooking the river. The Monongahela River does provide, in places, pleasing aesthetic riverscape views which enhance recreational activities. However, in those reaches where coal mining is the predominant industry, the aesthetic character of the river has been reduced in quality. The growth of this industry has inherently increased the number of barge mooring cells along the river which, when occupied by tows, detracts from the general appearance of the watercourse. In addition, coal loading facilities similarly detract from the aesthetic environment due to generated noise, the presence of large numbers of tows and coal spillage on the banks which introduces coal fines into the water.

f. Recreational and Visitor Facility Needs.

(1) Recreational Needs - Recreational usage of Pools 7 and 8 has been decreasing over the last decade. This is due, in part, to unfavorable weather patterns, poor economic conditions, several periods during which oil and gasoline suppliers were restricted and a long-term trend toward stabilizing populations in the surrounding counties. The most significant contribution, however, is the lack of proper access, which severely restricts use of this area. Currently, public boating access is limited to three sites in the upper portion of Pool 8 with no access in Pool 7. Access needs can be satisfied under the existing authority for cost-shared recreational development at completed projects using the master planning and Code 710 programs.

(2) Visitor Facility Needs - Public access to the lock and dam operational land and support facilities for public health and safety are needed for viewing project operations, associated picnicking and use of the tailwater fisheries. Access and support facilities are addressed in the MAIN REPORT and will be furnished as a project cost.

g. Cultural Resources. A cultural resources reconnaissance of the tentatively selected project site and potential area of the pool raise was conducted for the District by representatives of the Carnegie Museum of Natural History in 1975.

The purpose of the reconnaissance was to assess the general nature of cultural resources probably present and the impact of the tentatively selected plan. This report, kept on file in the District office, identified five sites that would be affected by the tentatively selected plan. This reconnaissance will serve as the basis for more intensive investigations to determine the number, extent and scientific value of the cultural resources present upon the authorization of a specific alternative plan. In addition, an archaeological record survey was completed for the District in 1980 by the Carnegie Museum. This study consisted of a literature search of available information on sites adjacent to the Monongahela River along its entire length. The Commonwealth of Pennsylvania Historical and Museum Commission by letter of 1 July 1983 commented on the project and listed all the known recorded sites in the study area that could possibly be impacted by the adoption of a specific construction alternative (See EIS EXHIBIT A).

Friendship Hill, the home of Albert Gallatin, is the only site adjacent to the proposed project area that is listed on the National Register of Historic Places. The property borders Pool 7 on the right bank just upstream of Lock and Dam 7. The house and outbuildings are located on a high terrace about 250 feet above the river. The National Park Service has purchased the lands around the historic site, which extend down to the river and include about two miles of shoreline.

SECTION V. ENVIRONMENTAL EFFECTS

1. ENDANGERED SPECIES

There are no Federally listed or proposed endangered or threatened species known to exist within the project impact area. A letter received from the U.S. Fish and Wildlife Service, EIS EXHIBIT B, confirms the above determination.

2. WATER QUALITY

Activities associated with a construction alternative would only temporarily affect water quality. During construction, turbidity levels would rise in the immediate vicinity of the project area; however, most of the work would be accomplished in the dry, utilizing cofferdams which would significantly reduce the amount of particulate matter entering the water column. Dredging activities associated with improving lock approach conditions and dam removal to ensure a nine-foot deep navigation channel would increase turbidity levels. The anticipated turbidity increases would occur only during construction and would return to preproject levels upon completion of the selected plan.

A Preliminary Section 404 (b)(1) evaluation which examines the effects of the discharge of fill material on the aquatic ecosystem is contained in EIS APPENDIX A. The Section 404 evaluation discusses in detail the potential impacts on water quality, physical substrate, dissolved oxygen, etc., that could result from implementation of the tentatively selected plan.

Most of the water intake systems in the project area draw directly from the river with usually only a group of stones in front of the intake pipes to prevent the admission of large debris. These stones would have little affect on reducing concentrations of suspended solids taken in by the systems. However, no municipal water intake in the project area is expected to experience increase treatment costs since turbidity levels would be minimized by the cofferdams. Temporary increases in downstream turbidity caused by dredging for the lock approaches and the initial construction of the cofferdams would settle out before reaching the nearest intakes located at Masontown, three miles downstream of the Grays Landing site, and Dilliner located 2.8 miles below Lock and Dam 8. The nearby systems in and downstream of the project area are located at Carmichaels (r.m. 75.2), Nemacolin (r.m. 77.2), Masontown (r.m. 79.2), just upstream of Lock and Dam 7 (r.m. 85.3), and Dilliner (r.m. 88.0).

As previously described in the EIS, dredging would not cause any priority pollutant release due to the disturbance of bottom sediments. From the testing performed during the study, it appears that pollutants remain tightly bound to sediment particles and would not be released into solution when agitated as would occur with dredging. Therefore, no significant water quality impacts resulting from the leaching of toxic substances into the water column from the resuspension of bottom sediments are anticipated.

Moderate thermal and dissolved oxygen stratification has been observed during summer low flow periods in some of the deeper water areas in the upper Monongahela River. Along the reach between river mile 82.2, the Grays Landing site, and river mile 85, where the pool would be raised 15 feet, water depths may exceed 30 feet in some localized areas. Under proper conditions some moderate dissolved oxygen and thermal stratification can be anticipated. This condition should, however, be neither frequent nor extensive. The alternative which would place a new dam at river mile 83.6 and remove both Locks and Dams 7 and 8 would provide opportunities for greater thermal and oxygen stratification due to the pool raise required. The area between the dam site, river mile 83.6 and Lock and Dam 7 would be raised 34 feet and the Lock and Dam 7 pool would be raised 19 feet. This alternative would cause significant thermal and dissolved oxygen stratification and could be at various times of the year severe.

3. AQUATIC COMMUNITIES

Approximately 230,000 cubic yards of dredging would be required for the tentatively selected plan. About 30,000 cubic yards of material would be removed to provide a nine-foot navigation channel at the site of Lock and Dam 7. The remaining 200,000 cubic yards would be removed to provide proper lock approaches for the new lock at Lock and Dam 8 and the new Grays Landing Lock and Dam. This would result in localized adverse effects on the river's aquatic communities. These effects would be those associated with the physical removal of the existing river bottom substrate at the dredging sites and the settling out of resuspended solids downstream of these sites.

The benthic organisms inhabitating the dredging sites would be removed with the removal of the substrate. This complete removal of benthic organisms would be temporary as the dredging sites would begin to repopulate with the cessation of work. The species composition and abundance of benthic organisms inhabitating these sites after dredging may be altered in response to differences in the nature of substrate material and differences in water depth. The single lock and dam alternative would require only approximately 78,000 cubic yards of dredging to provide a nine-foot navigation channel at the sites of Locks and Dams 7 and 8.

The 15-foot pool raise between the existing Lock and Dam 7 and the tentatively selected Grays Landing Lock and Dam site would cause a loss of shallow water area (those areas less than eight feet deep). Approximately 53 acres of shallow water area exist in the reach of river between Lock and Dam 7 and the tentatively selected Grays Landing site. The pool raise associated with this plan would eliminate 36 acres or reduce the shallow water area by about 68 percent.

Presently, there are 136 acres of shallow water area between river mile 83.6 and Lock and Dam 8. The single structure alternative would, due to the pool raise, reduce this area to 98 acres, a reduction of about 28 percent (38 acres). Both plans would permanently eliminate similar amounts of shallow water area, the difference being the tentatively selected plan concentrates the loss within 2.8 river miles while the other alternative would confine the loss to 7.2 river miles.

The shallow water area is an important habitat component in supporting a diversified fishery resource. This type of aquatic habitat usually exhibits high biological productivity and is necessary for good reproductive success for many fish species, as well as the growth of aquatic vascular plants and the production of fish food organisms. In a canalized stream, where a large portion of deep water is provided for navigation, the amount of shallow water area may be considered a controlling factor in the development of a diverse, productive fishery.

The loss of either 68% or 28% of shallow water habitat would reduce fish populations. This potential adverse impact in the area of the pool raise will be reduced by improving the habitat value of the new shallow area through the placement of stone bank protection and the selective clearing of vegetation.

The navigation dam tailwaters are also a valuable habitat of the Monongahela River fishery. In the project area the tailwaters have been found to support diverse fish populations and to concentrate game fish. Walleyes seasonally congregate here and both walleyes and yellow perch appear to spawn in the tailwaters. Because of the abundance of game fish, these areas receive substantial amounts of concentrated fishing activity and are important resources in that respect.

The single structure alternative, replacing two dams with one, would result in a net loss of one area of this habitat and concentrated fishing activity. This loss would be significant, both in terms of fish production and fisherman success, and could not be replaced in kind.

The tentatively selected plan would not reduce the number of tailwater areas available, and, therefore, would not adversely affect the river's fishery. Although there are no formal public access provisions at the present Lock and Dam 7 tailwaters, an adjacent public road and undeveloped property allow easy access and facilitates tailwater fishing. However, access to the abutment of the new dam would be required for continued maintenance and would provide easy access for fishing activity. Accordingly, minimum facilities for the health and safety of visitors will be provided.

4. TERRESTRIAL COMMUNITIES

The implementation of a construction alternative will cause terrestrial habitat loss and modification. The areas directly affected, which include the riparian zones, the lands utilized for dam abutments and lock land walls, and the areas set aside for disposal, total 194 acres for the tentatively selected plan and 407 acres for the single structure alternative. The pool raise of the tentatively selected plan would inundate approximately 58 acres of riparian habitat whereas the single structure alternative would, due to the much higher pool raise, inundate about 271 acres. The acreage for construction and disposal would be similar for both construction alternatives (54 and 82 acres, respectively).

During the fall of 1982, a Pennsylvania modified version of the U.S. Fish and Wildlife Service's Habitat Evaluation Procedure (HEP) was performed in the project area. HEP is a methodology for determining the quality and quantity of existing and future available fish and wildlife habitats. A team comprised of individuals from the Pittsburgh District Corps of Engineers, Pennsylvania Game Commission and U.S. Fish and Wildlife Service, State College office, participated in the study. The HEP determined that habitat ranged from above average to very poor and noted several small palustrine, emergent wetlands totalling 1.71 acres upstream of Lock and Dam 8 that would be affected by disposal operations. The habitat losses that would occur upon implementation of the tentatively selected plan will be reduced through increased management of Corps lands and disposal sites (See APPENDIX K of the MAIN REPORT for more detail).

5. AESTHETIC CHARACTERISTICS

The proposed project is not expected to substantially alter the aesthetic environment of the study area. Two effects would be noticed, and these would result directly from construction. Depending on the alternative chosen, the first aesthetic modification would be the transformation of the riverscape at Grays Landing or at the single structure site river mile 83.6, to a scene that will include a man-made structure - a new lock and dam. Conversely, the second effect would be the removal of Lock and Dam 7 or Locks and Dams 7 and 8 depending on the alternative selected. This action would create a setting almost devoid of man-made structures, except for the lock land walls, and hence would create aesthetics that would appear less undisturbed by man than at present. The addition of a lock at existing Lock and Dam 8 would negligibly affect the area's aesthetics.

Since there is already an operating structure present, the construction of an additional lock would not constitute a major aesthetic change.

6. RECREATIONAL CHARACTERISTICS

The implementation of either construction alternative would not affect the patterns of recreational activity in the project area. Visitor access would be provided at the new navigation facilities to view lock and dam operations. The project would provide the minimum facilities necessary to protect the health and safety of visitors.

7. CULTURAL RESOURCES

Both of the construction alternatives would have an impact on cultural resources in the project area. The tentatively selected plan's 15-foot pool raise between river mile 82.2 and 85.0 would impact on five recorded archeological sites, namely:

36 GR 54: Hamilton and Co. Pottery - river mile 84

36 FA 37: New Geneva Petroglyphs - river mile 84

36 FA 91: New Geneva Potteries - river mile 84

36 FA 128: Gallatin Glassworks #2 - river mile 84

36 FA 77: Martin Site - river mile 82

The single structure alternative would, because of the higher pool raise, have additional adverse impacts on extant archeological resources. In addition to the sites mentioned above, the following recorded sites, which include a reported woodland mound at the mouth of Dunkard Creek could also be impacted:

36 FA 68: Manganese Site - river mile 87

36 FA 64: Kenneth B. Evans Site - river mile 87

36 FA 66: Winstead South - river mile 87

36 FA 69: Fire House Site - river mile 90

36 FA 72: Island Site - river mile 90

This pool raise would also impact on National Park Service lands at Friendship Hill. Although none of the buildings at the historic site itself would be affected, 105 acres of Park Service lands along the river would be inundated up to elevation 797 NGVD. Upon authorization of either plan, further cultural resources investigations would be pursued in accordance with Section 106 of the National Historic Preservation Act of 1966 and Advisory Council on Historic Places procedures (36 CFR 800). An estimate of the cost for future cultural resources investigations is included in APPENDIX I, TABLE 11.

8. STREAMFLOW AND FLOODING

A fixed crest dam such as proposed for the Grays Landing site would impede the passage of floodwaters, resulting in a backwater effect. This effect, which varies with the magnitude of the flood flows, decreases from a maximum at the dam to a relatively small increase at the upstream end of the pool. Potentially the tentatively selected Grays Landing Lock and Dam could cause increases in flooding from the project site upstream to Point Marion Lock and Dam. To reduce this effect, the Grays Landing Lock would

be used as a floodway when the upper pool reached elevation 791.0 NGVD (corresponding to a flow of about 108,000 cfs). This would minimize the backwater flooding increase over existing conditions between the Grays Landing Dam and Dam 7.

The current average annual damage in this 2.8-mile reach is estimated at $27,000. This represents damage to 22 structures with basement flooding only, nine with first floor flooding, and three structures that would experience flooding to the second floor. The remaining tracts with habitable structures experience flooding of the grounds only. Flood damage estimates have been based on 1973 field surveys, with values indexed to an October 1983 cost level, and include damage to structures and contents, damage to highways, utilities, grounds, ancillary buildings, and income and wage losses. After construction of a new fixed crest dam at r.m. 82.2, the average annual damages are projected to increase by approximately $40,000 to about $67,000. This increase would result in increased flooding to all previously identified habitable structures, as well as to additional real estate. No additional habitable structures would be affected by the induced backwater flooding. Since the increased flood damages would be directly related to the navigation project, it was determined, as a minimum, to compensate those affected by the increases. This would be accomplished by acquiring modified flowage easements on 315 acres up to the new 100-year flood level that would permit 43 habitable structures to remain, providing the structures are suitable for floodproofing and further providing that an amicable agreement can be reached with the landowner. The floodproofing would include some or all of the following:

Foundation Extension
Sealing of Foundation and Basement Openings
Installation of Sump Pump Systems
Installation of Sewer Valves
Raising of Superstructure
Access and Utilities Adjustments

If the structure is not suitable for floodproofing and/or an amicable agreement cannot be reached with the land owner, a standard flowage easement will be acquired.

The single structure alternative would cause large increases in flood levels at both Greensboro and Point Marion. About 555 acres of the land subjected to increased flooding would be acquired as flowage easements or fee by the Government, due to the raised ordinary high water profile. Flood heights at Point Marion could also be reduced by drawing the pool down with the movable crest dam when floods are above elevation 797.0, as was discussed using the lock as a floodway at the tentatively selected structure at river mile 82.2.

9. SOCIO-ECONOMIC RESOURCES

a. Noise. Ambient noise levels in the immediate vicinity of the project sites would increase upon initiation of construction activities. The

use of heavy construction equipment would be the primary source of sustained noise during working hours. Periodic blasting to remove Locks and Dams 7 and 8, depending on the selected alternative, would also cause temporary noise disturbances. However, these instances would be limited in number and of very short duration. After construction ceases, noise levels would return to preproject conditions. Noise due to tows passing through the locks would be minor and merely transferred from an existing lock site to a new one.

b. Displacement of People. The recommended plan would require the relocation of seven residences. The single structure alternative would require the relocation of 61 residences, three businesses and one church.

c. Community Cohesion. The recommended project would have no known significant impacts on community cohesion. Due to the small sizes of the surrounding communities, the relocations associated with the single structure alternative would constitute an adverse impact that would likely negatively affect community cohesion.

d. Desirable Community Growth. There would be no long term or permanent community growth that can be attributed to either construction plan.

e. Tax Revenues. Tax revenues may increase due to increased employment opportunities associated with the project.

f. Property Values. Local property values would not be affected by the construction of the tentatively selected plan. The single structure alternative may decrease property values in Greensboro because the required pool raise would inundate a large section of the community.

g. Public Facilities and Services. Public facilities and services would be temporarily affected during the construction of either alternative due to the influx of construction workers. The effect would end upon completion of the project.

h. Employment/Labor Force. A construction alternative would provide for increased employment opportunities in the local area.

i. Business and Industrial Activity. A potential increase in the development of business and industry could occur with the construction of new, modern navigation facilities. The new structures would increase the reliability of the waterway system.

j. Displacement of Farms. No farms would be displaced by the adoption of a construction plan.

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SECTION VI. PUBLIC INVOLVEMENT AND COORDINATION

1. PUBLIC INVOLVEMENT PROGRAM

a. Lock and Dam 7. A public meeting was held in Masontown, Pennsylvania, on 17 July 1964, to consider the proposed replacement structures for Lock and Dam 7 to be located in the vicinity of Grays Landing, Pennsylvania, at river mile 82.2. The replacement structures considered consisted of a gated dam and a larger modern lock, 84 feet wide by 720 feet long, with provisions incorporated in the design for the possible future construction of a second lock of the same dimension, riverward and adjacent to the initial lock, should future growth in traffic warrant this addition. The hearing was attended by approximately 60 persons, including Federal, State, County and Municipal officials and representatives of commercial, industrial, civic, public utility, railroad and navigation interests. Oral statements were made and written statements submitted by a number of interested parties at the hearing and additional written statements were submitted by mail. Most interests, public and private, with only a few companies in disagreement, supported the project. However, considerable opposition was expressed to the construction of only one lock. It was requested that an additional smaller lock be provided during initial construction to accommodate smaller tows, conserve water and cut down delays should the main lock become inoperable. An objection to the project was raised by representatives of the Monongahela Railroad Company, who contended that a raise in pool would cause instability of its road bed due to inundation of the river banks.

b. Lock and Dam 8. A public meeting was held in Point Marion, Pennsylvania on 11 March 1966 to consider the proposed replacement of existing Lock 8 at river mile 90.8, in the vicinity of Point Marion, with a larger, modern 84 by 720-foot lock immediately landward of the existing lock. The hearing was attended by 33 persons, including Federal, State, County, and Municipal officials and representatives of commercial, industrial, civic, public utility and navigation interests. Oral statements were made and written statements were submitted by mail. All interests, public and private, endorsed the proposed project as beneficial to the improvement of the expanding waterway transportation system. The Pittsburgh Coal Exchange, however, in their transmitted statement, also strongly recommended not removing the existing 56 x 360 foot lock, but maintaining it in working order. They pointed out that any prolonged shutdown of the proposed single lock, occasioned by necessary repairs, would cause serious economic loss to the coal industry located upstream. The statement also mentioned that water could be conserved during periods of low flow by using the existing chamber for small tows and pleasure craft. This position was supported by several other companies. Transcripts of this meeting and the one in Masontown are available for review in the Pittsburgh District Office.

c. Lock and Dam 8 and Grays Landing Lock and Dam. A public meeting was held in Point Marion, Pennsylvania on 19 October 1983 concerning the proposed project. Prior to the meeting, the Corps established four information centers which afforded local residents the opportunity to ask

questions and comment on the Draft Feasibility Report and EIS and inquire about specific issues. APPENDIX L - Public Involvement contains detailed information concerning this meeting.

2. REQUIRED COORDINATION

The Pittsburgh District, Corps of Engineers is the principal responsible agency for conducting and coordinating this study, and for plan formulation, consolidation of information from prior studies (both Corps of Engineers studies and those of other agencies), preparation of the report and Environmental Impact Statement (EIS) and the development of report recommendations.

These studies have been coordinated with appropriate Federal, State and local agencies as well as private industry, and the general public as part of an ongoing process which began in the mid-1940's. During the preparation of the EIS, the U.S. Fish and Wildlife Service (USFWS), Pennsylvania Game Commission (PGC), Pennsylvania Fish Commission (PFC) and the Pennsylvania State Historic Preservation Officer, have been consulted and informed of the District's Feasibility Study on the Monongahela River. The PGC, PFC, USFWS and the Corps participated in several meetings to determine appropriate studies necessary to properly complete the EIS. As a result, the USFWS, PGC and Corps participated in a Pennsylvania modified version of the USFWS's Habitat Evaluation Procedure (HEP Study) of the project area. The results of this study are contained in APPENDIX K of the MAIN REPORT. In addition, the USFWS was contracted by the Corps to complete a sampling and testing study of the Monongahela River in the project area, the results of which are included in APPENDIX K.

A meeting was held on 18 March 1980 with the Pennsylvania Department of Transportation, the Southwestern Pennsylvania Regional Planning Commission and numerous railroads located within the study area to coordinate the Monongahela River navigation studies (which included Locks and Dams 7 and 8), along with alternative transportation modes which may be subject to changes occurring along the waterway system.

3. PUBLIC VIEWS AND RESPONSES

Public views and responses have been very limited in scope and generally site specific. No comments were received on the Draft EIS, which resulted in major changes in the study's decision factors.

Seven Federal and State agencies and two individuals provided review comments on the Draft EIS and required responses. These letters and additional letters which require no responses are reproduced in APPENDIX L - PUBLIC INVOLVEMENT. Those comments requiring responses or modifications to the Draft EIS are presented on the following pages:

Letter: United States Department of Agriculture, Soil Conservation Service, 17 November 1983.

Comment: "It does appear that the disposal areas at both proposed sites consist of prime farmland soils. Much of the proposed disposal site for the new lock and dam at Grays Landing (#7) is mapped as Chavies fine sandy loam (Ce-Sheet 39, Insert A, Soil Survey of Fayette Co. - March 1973). Similarly, much of the proposed disposal area for the new lock and dam (sic) at Point Marion (#8) is mapped as Huntingdon silt loam (Hu - Sheet 164, Greene-Washington Soil Survey - 1983). However, according to current land use maps and aerial photography, most or all of this land is in grassland, brush or wooded condition except for the portion which extends into West Virginia. This tract is labeled "Cultivated"."

"The proposed increase in normal pool level at lock and dam #7 may cause inundation of some Philo silt loam (Ph Sheet 53, Soil Survey of Fayette Co. - March 1983) along Georges Creek. The Draft Environmental Impact Statement EIS - 3 Rev 9/16 (Blue Sheets) indicates "N/A" regarding prime or unique agricultural lands."

Response: Placement of disposal material will affect approximately 82 acres of land. It is recognized that portions of the areas set aside for disposal at both the Grays Landing Lock and Dam and Lock and Dam 8 sites contain prime farmland soils. These soils are located within thin sections of land immediately adjacent to the proposed new structures. Use of these particular areas for disposal is necessary to recontour the existing land for project operation, visitor access and day-use facilities. Also, they were selected to minimize the cost of disposal operations. Portions of these areas, after placement of the disposal material, will be managed in a manner that provides for wildlife habitat. The Corps believes that the loss of these unused prime farmland soils, which would amount to considerably less than 82 acres, is justified by the higher use in which these lands will be placed in conjunction with the proposed navigation structures.

The section of land labeled as "Cultivated" is not included in the disposal area. The project boundary does not extend beyond the Pennsylvania-West Virginia state line.

The Final EIS has been revised to indicate "Full" compliance with the CEQ Memorandum on prime or unique agricultural lands.

Comment: "Volume 1, page 60 of Main Report, indictes (sic) approximately 39,000 cubic yards of excavated material and about 188,000 cubic yards of dredged material at Lock and Dam #7 will be disposed of in the disposal area. Likewise, a large volume of materials will be disposed at Lock and Dam #8. Much of this site is to be filled to a depth of four feet. It appears that a detailed erosion and sedimentation control plan will be needed for both disposal sites. These plans should address both temporary control measures (during disposal) and permanent control measures at these sites."

"Page 61 of the above report indicates several public utilities and private facilities will need to be relocated. Detailed erosion and sedimentation control plans should be prepared for each of these specific sites."

"Also, site specific erosion and sedimentation control plans should be prepared for the actual construction sites at both locations and for both streambanks."

Response: Corps policy requires the implementation of sedimentation and erosion control measures during construction of all projects, where applicable. The specific requirements for erosion and sedimentation control will be developed during the "Plans and Specifications" stage of the project and included in the construction contract.

Letter: Office of the Secretary, Mid-Atlantic Region, United States Department of the Interior, 28 November 1983.

Comment: "Main Report, Page 60, Pool Preparation."

"Section g states that "all land would be cleared of trees and other growth..."

"If a portion of these trees and all of the shrubs and brush can be left standing or cut off and cabled to their stumps, aquatic habitat for many fish species in the river will be improved. This would also mean less money spent on clearing and would be more consistent with Section i, paragraph 2 on page 62 and in paragraph 3, page EIS-29, which states that mitigation for loss of shallow water habitat could include"... selective clearing of trees and brush.""

Response: SECTION VII, paragraph 2.g. of the Draft MAIN REPORT has been changed to be consistent with the Final EIS. Selective clearing of brush and trees is proposed.

Comment: "The three small palustrine emergent wetlands located near Lock and Dam 8 are not dominated by cattails, and their small size does not necessarily make them unimportant (see Appendix K, page N, paragraph 2 and page 21, paragraph 1). One of the wetlands (classified as palustrine scrub shrub) contains a variety of emergents and shrubs including buttonbush, umbrella sedge, and spike rush. The other two emergent wetlands are apparently degraded by acid mine drainage. Compensation for project-related wetland losses are being addressed in the Fish and Wildlife Service's Fish and Wildlife Coordination Act report which will be sent to you by December 1, 1983."

Response: We concur with the comment. SECTION IV, paragraph 1.f. of the Draft EIS has been changed accordingly to reflect the above statements.

Comment: "The report indicates that a cultural resources reconnaissance of the tentatively selected project area located five sites potentially eligible for listing in the National Register of Historic Places. The document also indicates that the Pittsburgh District Corps of Engineers plans

to proceed with more intensive survey and evaluation upon authorization of a specific plan. This approach would logically lead to compliance with Section 106 of the National Historic Preservation Act of 1966. The draft environmental impact statement does document consultation with the Pennsylvania State Historic Preservation Officer on the potential of the project to adversely affect cultural resources."

Response: Noted for compliance.

Comment: "The document indicates adequate consideration has been given to providing for public recreation activities within the project boundaries. We urge continued consultation with state and local park and recreational agencies regarding any potential adverse impacts on existing and planned recreational facilities and uses at the project site."

Response: Noted for compliance.

Letter: Office of the Secretary, Mid-Atlantic Region, United States Department of the Interior, 30 November 1983.

Comment: "This letter is a supplement to the previous Department of the Interior letter of 28 November 1983 and contains comments on the effect new navigation structures would have on National Park System resources and cultural resources in the project area. The comments discussed the relationship between a new Grays Landing Lock and Dam and the existing Friendship Hill National Historic Site, and dealt primarily with matters pertaining to land acquisition, access, removal of an existing dike, use of dredged and dike material at the park, potential development of park lands and future coordination with the Park Service."

Response: The level of detail needed to respond to the comments and concerns above has not been developed nor is it required during this phase of study. However, after project authorization, the Corps of Engineers will, during the next study phase, fully address each of the concerns mentioned to the maximum extent allowable by law. As recommended in the letter, the Corps will continue to discuss these concerns directly with the Area Manager at Friendship Hill Historic Site and coordinate future matters with him.

Letter: Commonwealth of Pennsylvania, Department of Environmental Resources, 17 November 1983.

Comment: "We identify fourteen (14) sources of public water supplies in Pennsylvania that might suffer adverse affects due to the project. Consideration must be given to these water supplies where elevations are to be changed or where construction might cause siltation and degradation of the raw water supply."

Response: During project construction, the work expected to create turbid conditions would consist of driving and removing sheet piles for cofferdam construction and disassembly, removing Lock and Dam 7, and dredging the channel bottom to provide channels of sufficient depth for the new lock approaches and through the site of Lock and Dam 7.

Only two of the 14 public water supply intakes noted in the comment are within the affected project reach, r.m. 82.2 to r.m. 90.8. Both of these intakes, located at r.m. 88.0 and r.m. 85.4 are over two and one-half miles downstream of the nearest construction site. It has been the Corps' experience that most of the resuspended river bottom sediment and turbidity associated with dredging operations settle out within one mile downstream. Turbidity levels beyond one mile downstream are usually no greater than levels normally occurring in the river. Consequently, we do not anticipate that municipal water authorities in the project area would encounter any significant increases in turbidity and suspended solids. The remaining 12 water intakes mentioned are from three to 27 miles downstream of the project area and for reasons mentioned above would not be affected.

To insure that no unexpected problems arise, a specification will be included in the construction contract that will require the Contractor to notify downstream municipal and industrial water intake owners of impending construction activities.

Letter: Advisory Council on Historic Preservation, 23 November 1983.

Comment: "The Draft Environmental Impact Statement (DEIS), attached to the Draft Feasibility Study, indicates that in 1975 a cultural resources reconnaissance identified five sites that would be affected by the tentatively selected plan. The Pennsylvania State Historic Preservation Officer's (SHPO's) letter of July 1, 1983, also lists significant archeological sites that are located in or near the project's potential site and suggests that others may exist. In addition, the DEIS notes that Friendship Hill, a property included in the National Register of Historic Places, borders Pool 7 just upstream from Lock and Dam 7."

"We appreciate your efforts to research these properties. Pursuant to the Council's regulations, "Protection of Historic and Cultural Resources" (36 CFR Part 800), we recommend that you continue to study and identify historic and archeological properties within the area of the undertaking's potential environmental impact, and in consultation with the Pennsylvania SHPO, determine which (additional) properties may meet the National Register Criteria, assess the effect of the undertaking on these properties, and if appropriate, afford the Council an opportunity to comment."

Response: Noted for compliance.

Letter: Commonwealth of Pennsylvania Historic and Museum Commission, 14 October 1983.

Comment: "There is a high probability that archeological resources may be affected by the construction of the Grays Landing Lock & Dam and the subsequent inundation of land between that site and the present Lock & Dam #7. A survey or limited testing of the area should be undertaken to locate potentially significant archeological resources. . . This phase of the project may also affect a number of historic properties that are potentially eligible for listing in the National Register of Historic places.

The significance of any docks, tipples, or other structures that will be demolished, moved, altered, or otherwise affected must be evaluated. This also applies to any highway or railway bridges and buildings."

Response: The Corps recognizes its responsibility to identify and protect those cultural resources which could be adversely affected by the proposed projects. During investigations leading to this Feasibility Report and EIS, the Corps maintained close coordination with institutions knowledgeable of the historic and archaeological resources located in the project area (Carnegie Museum of Natural History and California State College). In accordance with Section 106 of the National Historic Preservation Act and Advisory Council on Historic Preservation regulations (36 CFR Part 800), after project authorization, the Corps will continue to study and identify historic and archaeological properties that may be affected by project construction and operation. These studies will identify which properties meet National Register eligibility criteria and identify appropriate measures to mitigate any adverse effects. All future cultural resources studies will be closely coordinated with the Pennsylvania State Historic Preservation Officer and the Advisory Council.

Letter: United States Environmental Protection Agency, Region III, 25 November 1983.

Comment: "The Corps of Engineers should develop a mitigation plan which incorporates, at the least, those recommendations made by the U.S. Fish and Wildlife Service, in their draft report of September 1983 (pp. 2, 26-30; Appendix K, Vol. 3 USACOE). The formal mitigation plan prepared with the cooperation of USFWS and the Pennsylvania Fish Commission should be submitted to our agency upon its completion, for our review and comment."

Response: Potential impacts to fish and wildlife resources are identified and discussed in the report from the U.S. Fish and Wildlife Service attached as APPENDIX K. This report recommends measures to compensate for identified losses which are in accordance with the Service's current policy. These recommendations (except for angler access to the abutment at Dam 8) are to be accomplished through standard design practices and provisions for the health and safety of visitors. Therefore, separate mitigation measures are not required.

Comment: "The final EIS should provide detailed explanation for the disposal of spoil from excavation and dredging, including specific locations of storage areas."

Response: The primary disposal sites for the proposed Grays Landing Lock and Dam and the new lock at Lock and Dam 8 would be on lands immediately adjacent to each of the new facilities. The land for the Grays Landing project would be acquired by the Federal Government and is necessary for project operation in addition to disposal. A major portion of the lands required for the new Lock 8 disposal area are currently owned by the

Federal Government. These areas are shown generally on PLATES 5 and 9 of the MAIN REPORT. The disposal from dredging will also be placed in these two areas. Together, the disposal sites comprise a total of approximately 82 acres. All disposal material will be placed on these upland sites in such a manner that it will not return to the river.

Comment: "The relocation of Lock and Dam No. 7 to a point further downstream will create a new larger pool. This new pool will raise 2.8 miles of river by 15 feet. While the draft EIS discussed the impact of the elevation change on existing facilities, in this reach, the final EIS should also consider the impacts to the aquatic environment of both Georges and Jacobs Creeks."

Response: Deteriorated water quality, due primarily to a combination of acid mine drainage and domestic wastes, has severely affected Georges Creek. As a result, this stream does not support a productive fishery. The 15-foot pool raise that will be largely confined within present streambanks would, therefore, not be expected to cause any significant adverse impacts to Georges Creek. Jacobs Creek, an extremely small stream, with an average annual flow of less than five cubic-feet per second, does not support a fishery of significance. The proposed pool raise which, as with Georges Creek, would be confined largely within the present streambanks and would not cause any significant adverse impacts to the aquatic environment.

Comment: "The draft EIS briefly discussed the Corps' hydropower development at both Lock and Dam No. 7 and No. 8. The conclusion was that '...the cost of installation exceeded the hydropower benefits...' (p. 43, Feasibility Study, USACOE). However, there are preliminary license application to the Federal Energy Regulatory Commission to privately develop hydropower facilities at both site. The final EIS should include discussion of these hydropower proposals."

Response: Due to economic infeasibility, the addition of hydropower units at either the proposed Grays Landing Dam or Dam 8 is not being considered in the plan being recommended in the Feasibility Report. As mentioned in the comment, the Federal Energy Regulatory Commission (FERC), on 1 April 1983, issued a preliminary permit for the study of non-Federal hydropower development at existing Dam 7 to ENERGICS SYSTEMS INC. of Washington, DC. An earlier study permit for hydropower development at Dam 7 was also issued by FERC to Atlantic Power Development Corporation. However, the earlier permit was surrendered by the applicant on 25 October 1982 because of pending renovations of the dam by the Corps rendering the project infeasible. The current applicant has also been advised of the potential removal of Dam 7 should the proposed Grays Landing Lock and Dam be authorized for construction. Currently, there is also a license application under consideration by FERC for private hydropower development at existing Dam 8, which was submitted by the Borough of Point Marion, Pennsylvania in October 1983. However, to date the Corps has not received notice from FERC that the license application has been accepted for filing.

Letter: Individual letter from Phillip Kirk, Morgantown, WV, 25 October 1983.

Comment: "I am also greatly concerned that the utmost consideration be given to the citizens who may be displaced from their homes and businesses in the affected areas."

Response: As noted in EIS SECTION I, paragraph 3., and EIS SECTION II, paragraph 2., the Corps recognizes the concerns of the local residents within the project area. After project authorization, all of the public concerns relating to real estate acquisition will be addressed during the next phase of study. The Corps, as required by law, will cooperate fully with local authorities and individuals to ensure that project-related real estate impacts are equitably resolved.

Letter: Community of Greensboro, 7 December 1983.

Comment: "We take issue with the Summary of the Feasibility Draft which states "at the present time there are no known areas of controversy . . . There are no unresolved issues associated with this project". On the contrary, we are very concerned about the proposed 15 foot rise in the pool and the increased probability of damaging floods in our communities. The affected property owners were not contacted by those preparing the environmental impact is also a cause for concern."

Response: The Final EIS has been revised to reflect the unresolved issues that have been expressed by the citizens of the project area. With regard to contacting affected property owners, the Corps, during this phase of study only, identifies the significant general social, environmental and economic impacts that could result from project implementation. After project authorization, affected property owners will be individually contacted to establish and resolve project related impact(s). (Refer to page EIS-32.)

Comment: "Why is the 15 foot rise in the river necessary?"

Response: The 15 foot increase in river level is required to maintain the existing Pool 7 level between Lock and Dam 7 and the proposed new Grays Landing Lock and Dam 2.8 miles downstream. The Grays Landing location for the new dam was chosen from a number of alternative sites which included the existing Dam 7 location. The decision to place the new dam at Grays Landing was based on economic and navigational factors as well as environmental and social considerations.

Comment: "Why can't the channel be deepened to offset the potential for damaging floods?"

Response: Deepening the channel would not result in any significant reduction of flooding levels.

Comment: "Why not build a gated dam instead of a fixed crest dam? How much more would the cost of a gated dam be than the damage to our properties over the 50 year life span of the dam? Would the higher cost not be justified in terms of minimizing flood damage and the worry and inconvenience of sleepless rainy nights the people of the affected areas will be forced to experience over the life time of the dam? Don't we, the taxpayers and property owners, who will be flooded have a right to help decide this issue?"

Response: While the Corps appreciates the concerns of those within the area of the pool raise, it is necessary when making an economic analysis that all factors be expressed in monetary terms. The feasibility of constructing a gated dam at the new Grays Landing site was investigated, and it was determined that it would cost approximately 13.2 million dollars more than the proposed fixed crest dam and any related increased real estate costs. The annual equivalent cost of the additional 13.2 million dollar investment would be in excess of 1 million dollars. When compared with the estimated increase in annual flood damages of $40,000 per year, due to the pool raise, the cost of a gated structure is grossly uneconomical.

Comment: "We lack confidence in the statistical projections of flood frequency and damage estimates of the feasibility study. These figures are not in line with our own flood experiences. We believe that more direct study of our communities is indicated before the impact of the 15 foot rise in the river pool can be assessed."

Response: The Corps of Engineers has used the most up-to-date and accurate methods available in determining flood frequencies, elevations and the associated flood damages that would be expected to occur with the increased pool level in the project area. The hydrologic calculations have been based on 47 years of flooding history. A correlation between the calculated information and the historical data indicates that the flood frequencies, elevations and estimated flood damages are reasonable.

Comment: "The environmental impact statement has not described in sufficient detail the effect of the 15 foot rise in the pool on our community facilities and low lying properties. It is even more lacking in detail concerning the protective measures that can reasonably be undertaken to safe guard our vital community services."

Response: The level of detail in this Feasibility Report and EIS are sufficiently accurate to permit the Corps to make reasonable estimates of the general impacts and costs associated with the change in flooding potential. More detailed studies to establish specific information on individual properties will be undertaken only if and when this project is authorized by the U.S. Congress.

Comment: "We are very uneasy about the proposed easements the Government will seek from owners of properties that will be flooded periodically. What factors will the payment formula consist of? Will the affected property owners participate in deciding these factors? Why will the Government not want to purchase homes and other property that is likely to be flooded? Surely our flood insurance and other liabilities will increase and our chances of selling our properties to other interested parties will diminish. Will these problems be considered in establishing the cost of the easements?"

Response: See response to comment from Mr. Phillip Kirk, Morgantown, W.V., on page EIS-45.

Comment: "The feasibility study doesn't mention our Greensboro landing, which for many years served as the southernmost navigable port on the river and as an important commercial center. It was the center of Greensboro's social and economic life for approximately 150 years. Today it is the only place in our community where small boats can enter the river. It is still a popular place for fishing and strolling and picnics and parties. Surely it and the people who use it deserve more attention than to let it quietly be inundated."

Response: The Corps recognizes the Greensboro landing and its potential historic value. During the next phase of study, after project authorization, additional cultural resource investigations will be conducted to determine the significance of all cultural resources affected by the project and whether they meet the criteria for inclusion in the National Register of Historic Places. The Greensboro landing will be included in these studies. Appropriate mitigation measures will be developed to minimize project related impacts to all National Register eligible properties. Also see the response to the Commonwealth of Pennsylvania Historical and Museum Commission letter.

With respect to the landing presently being a small boat access site and a popular place for local residents to enjoy fishing, strolling, picnics and parties, the new land-water interface expected to occur at the landing with a raised pool would continue to afford similar opportunities for these leisure time activities.

Comment: "There are inhabited places in Greensboro and Glassworks where already eroded banks will be washed away by repeated flooding. What will be done to protect these banks and the properties and people they support?"

Response: After project authorization, detailed studies will be conducted to determine those bank areas that may be susceptible to erosion. If any areas are found appropriate, stabilization and protective measures will be incorporated into the overall project design and implemented during construction.

Comment: "We are particularly concerned about the possibility of backed up sewers and flooded basements. What assurances can be given that plans will be developed in conjunction with local officials and the public utilities to assure that disruptions and deterioration of vital services will not occur? Since our communities are small and poor, special measures are needed to assure sufficient funds to support the development of sewers at the proper time. We question whether sufficient funds have been budgeted for this and the other concerns outlined above."

Response: The Corps is required, by law, to make adjustments to all public facilities affected by project construction. However, it must be recognized that adjustments will be made only to those facilities that are in conformance with applicable State and Federal regulations. The responsibility of the Corps is limited to the adjustment of existing public facilities directly affected by the project and does not include the development of other new public facilities (i.e., the development of a new community sewage system). Sufficient funds have been included in the cost estimate for project construction to make adjustments to all public facilities affected by the project. However, none of this money will be budgeted until after authorization of this project by the Congress.

Comment: "Finally, in view of the above concerns we should like to conclude by recommending that a special community environmental impact statement be developed (as an addendum to the present EIS) representative of local governments and affected property owners. This community impact statement should address demographic and socio-economic factors in addition to the impact of the 15 foot rise in the river level on community facilities. It should discuss sewers, water supply, roads, riverbanks, river landing and fishing grounds. It should identify all properties subject to flooding. It should contain a plan that deals constructively with the areas of impact. This plan should be formulated in conjunction with the affected communities because it involves a dovetailing of responsibilities. It should also contain a realistic budget adequate to deal with the areas of impact."

Response: The Corps believes that this EIS adequately identifies the general social, economic and environmental impacts expected to result from implementation of the various alternative plans to permit the Congress to select the plan of navigation improvement which is determined to be in the best overall public interest. Consequently, we do not concur with the recommendations that a special community EIS be prepared. Where cultural, and fish and wildlife impacts are identified, appropriate measures will be taken by the Corps in conjunction with concerned Federal and state agencies to minimize such impacts. With respect to impacts on community facilities and private real estate holdings, the Corps will coordinate directly with community officials and private citizens, see page EIS-32. However, none of this detailed work can proceed until a project is specifically authorized by the Congress.

4. STATEMENT RECIPIENTS

The following Senators, Congressmen, Federal, state, and local agencies and individuals will receive a copy of the Final Feasibility Study Report with the Final EIS included:

U.S. Senators and Congressmen

Pennsylvania

Senator	John Heinz
Senator	Arlen Specter
Congressman	Austin J. Murphy

West Virginia

Senator	Jennings Randolph
Senator	Robert C. Byrd
Congressman	Alan B. Mollohan

Federal Agencies

U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Agriculture, Forest Service
U.S. Environmental Protection Agency
U.S. Department of Housing and Urban Development
U.S. Department of the Interior, U.S. Fish and Wildlife Service
U.S. Department of the Interior, Office of Environmental Project Review
U.S. Department of the Interior, Bureau of Mines
U.S. Department of the Interior, Geological Survey
U.S. Department of the Interior, National Park Service
U.S. Department of Transportation
Federal Highway Administration
U.S. Coast Guard
Appalachian Regional Commission
Advisory Council on Historic Preservation

State Agencies

Pennsylvania Fish Commission
Pennsylvania Game Commission
Pennsylvania Department of Environmental Resources
Pennsylvania Historical and Museum Commission
Pennsylvania Department of Transportation
State Archaeologist
West Virginia Department of Environmental Resources

Local Interests

County Commissioners

Greene County, PA
Fayette County, PA
Washington County, PA
Westmoreland County, PA
Allegheny County, PA
Marion County, WV
Monongalia County, WV

Chairman, Board of Supervisors

Nicholson Township, PA
Springhill Township, PA
German Township, PA
East Bethlehem Township, PA
Brownsville Township, PA
Monongahela Township, PA

Office of the Mayor

Pittsburgh, PA
Brownsville, PA
West Brownsville, PA
Masontown, PA
Point Marion, PA
Rices Landing, PA
Carmichaels, PA
Clarksville, PA
Morgantown, WV

Allegheny County Department of Planning and Development
Western Pennsylvania Conservancy
Southwestern Pennsylvania Regional Planning Commission
Izaak Walton League of America
Audubon Society of Western Pennsylvania
Sierra Club, Pennsylvania Chapter
Penns Woods, West Chapter
Penn's Corner Resource, Conservation and Development Area
Carnegie Museum of Natural History
DINAMO-OVIA
Port Authority of Allegheny County, Pittsburgh, PA
Waterways Association of Pittsburgh
National Renewable Resource, Inc.
Consol Coal Company, Inc.
Masontown German Library
Monongahela River Towing Company

Local Interests (cont)

Individuals

Bassam Alwarith
Adam Novak
Robert Berenda
William P. Young
Paul Sunyak
Harry Maple
Beverly Clauster
Lydia Aston
Darwin F. Johnson
Dan Crafford
M. Barb
Mrs. Paul M. Popernack
Charles W. and Ruth Fox
James Torma
Keith Drew
Shirl and Neila Vernon
Andrew Billetz
Charles Maletic
Phillip Kirk
George E. Varndell
Rev. and Mrs. W. S. Harding
Edith Wamsley
Ernest McIntire
Ralph and Dolores Brown
Mike and Dorothy Shaloe
Geraldine Cooper
Bruce Heine
Rebecca Ann Bargestock
Joe and Linda Kois
Howard Meese
Mr. and Mrs. Joe Elnikor
Mrs. Helen Ehoff
Mike Krupinsky
Joe Krupinsky
Martin Gregan
Joe Zalar
Mary L. Muhar
Pearl Kayla
George Burick
Ray H. Borgerstock
Geraldine Meese
Jerry McMavis
Andy Bodi
Kenneth Moats
Alice Jenkins
Bertha Fisher
James Buttermore
John Hardy
Louise Popernack
Denny McIntire
D. J. Kramer
Darla Maletic
Keith R. Drew

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COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
WILLIAM PENN MEMORIAL MUSEUM AND ARCHIVES BUILDING
BOX 1026
HARRISBURG, PENNSYLVANIA 17120

July 1, 1983

Dept. of Army
Pitts. District, Corps of Engineers
William S. Moorhead Federal Building
1000 Liberty Ave.
Pittsburgh, PA 15222

Re: Upgrading of Monongahela River
Navigation System
ER83 042 0660

Attn: John L. Richards
Lt. Colonel, District Engineer

The above named project has been reviewed by the Bureau for Historic Preservation in accordance with Section 106 of the National Historic Preservation Act of 1966, Executive Order 11593 and the regulations of the Advisory Council on Historic Preservation (36 CFR 800).

Significant archeological sites are located in or near your project area and others are likely to exist. These resources could be adversely affected by project activities. Intensive testing of the archeological resources will be needed to determine their eligibility for listing in the National Register of Historic Places. For assistance in developing the necessary scope of work, please contact Kurt Carr of the Division of Planning and Protection at (717) 783-5216. The sites and areas that concern us are listed below.

Gr54,Fa37, 91, 128, 77, 68, 64, 66, 69, 72

If you need further information in this matter, please consult Bill McLaughlin or Kurt Carr of the Bureau for Historic Preservation at (717) 783-8947.

Sincerely

Donna Williams

Donna Williams, Chief
Division of Planning & Protection
Bureau for Historic Preservation

DW:sk

EXHIBIT A

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Suite 322
315 South Allen Street
State College, PA 16801

July 8, 1983

Lt. Colonel John L. Richards
District Engineer, Pittsburgh District
U.S. Army Corps of Engineers
Federal Building, 1000 Liberty Avenue
Pittsburgh, PA 15222

Dear Colonel Richards:

This is in response to your letter of June 9, 1983, requesting information on the presence of federally listed or proposed endangered and threatened species within the impact area of the Monongahela River Navigation System from River Mile 82.2 to River Mile 91.2 in Fayette and Greene Counties, Pennsylvania.

Three federally listed endangered birds are expected to be found as transient species in the project area. They are: bald eagle (Haliaeetus leucocephalus), peregrine falcon (Falco peregrinus), and Kirtland's warbler (Dendroica kirtlandii). There is no listed critical habitat for these species in the project area. All three species may stop to feed and rest along the river during migration.

The project area is within the historic range of the Indiana bat (Myotis sodalis) but there are no populations of this species known to occur there. The distribution of this species is strongly correlated with the major rivers within its range and it has been postulated that the major rivers are navigation routes for the Indiana bat. Small nursery colonies have been located in some areas under the loose bark of dead trees. Although suitable habitat for nursery colonies may be found within the vicinity of the project, we have no evidence that any Indiana bat nursery colonies exist in the project area.

The small whorled pogonia (Isotria medeoloides) presently exists or has been known to occur in 16 eastern states and Canada. It is most often found in mixed second growth hardwoods with a reltively open canopy and little shrub or herbaceous cover. It has been found, however, in a broad spectrum of conifer/hardwood habitat types and, in fact, may be found almost anywhere in the eastern United States. There are many as yet unanswered questions about its growth, reproduction and other life requirements.

There are presently 18 known existing populations (approximately 600 individuals) of this plant in the eastern U.S. and Canada. Although additional populations could occur almost anywhere, the chances of occurrence at any particular site are extremely remote. The Pennsylvania locations of historical populations are: Berks County (Reading), Chester County (West Chester), Green County (Rogersville), Monroe County (East Stroudsburg), Montgomery County (Willow Grove), and Philadelphia County (Philadelphia). The only known existing population in Pennsylvania is located in Centre County near the town of Port Matilda. Exact locations of plants are not released to reduce the chance of disturbance by plant collectors.

We have no information that indicates that any federally listed endangered or threatened species under our jurisdiction will be affected by operation or improvement of the Monongahela River Navigation System in the above listed area. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered. A compilation of federally listed endangered and threatened species in Pennsylvania is enclosed for your information. For information regarding State-listed species, contact the Pennsylvania Game Commission and the Pennsylvania Fish Commission.

Sincerely,

Charles J. Kulp
Field Supervisor

Enclosure

READEX FICHE best copy available

pages tightly bound

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN PENNSYLVANIA

Common Name	Scientific Name	Status	Distribution
FISHES:			
Cisco, longjaw	Coregonus alpenae	E	Lake Erie - probably extinct
Pike, blue	Stizostedion vitreum glaucum	E	Deep water of Lake Erie - probably extinct
Sturgeon, shortnose*	Acipenser brevirostrum	E	Delaware River & other Atlantic coastal rivers
REPTILES:			
None			
BIRDS:			
Eagle, bald	Haliaeetus leucocephalus	E	Entire State - nests only in Crawford County
Falcon, American peregrine	Falco peregrinus anatum	E	Entire State - re-establishment to former breeding range in progress
Falcon, Arctic peregrine	Falco peregrinus tundrius	E	Entire State migratory - no nesting
Warbler, Kirtland's	Dendroica kirtlandii	E	Western Pennsylvania - occasional migrant
MAMMALS:			
Bat, Indiana	Myotis sodalis	E	Entire State - only known wintering population in PA is in Blair County
Cougar, eastern	Felis concolor cougar	E	Entire State - probably extinct
Fox squirrel, Delmarva	Sciurus niger cinereus	E	Southeastern PA - probably extirpated

Federally listed endangered and threatened species in Pennsylvania (continued)

MOLLUSKS:			
Pearly mussel, orange-footed	Plethobasus cooperianus**	E	Ohio River drainage - no recent collections
Pearly mussel, pink mucket	Lampsilis orbiculata**	E	Ohio River drainage - no recent collections
Pigtoe, rough	Pleurobema plenum	E	Ohio River drainage - no recent collections
PLANTS:			
Small whorled pogonia	Isotria medeoloides	E	Entire State - historical populations in Berks, Chester, Green, Monroe, Montgomery & Philadelphia Counties Existing population in Centre County

*Principal responsibility for this species is vested with the National Marine Fisheries Service.

**Since listing, Plethobasus cooperianus has been renamed Plethobasus striatus and Lampsilis orbiculata has been renamed Lampsilis abrupta.

EIS APPENDIX A
PRELIMINARY
SECTION 404(b)(1) EVALUATION
REPLACEMENT OF LOCKS AND DAMS 7 and 8
MONONGAHELA RIVER PENNSYLVANIA

1. PROJECT DESCRIPTION

a. Location. The project area is located in southwestern Pennsylvania along the upper middle reach of the Monongahela River from river mile (r.m.) 82.2 to 90.8.

b. General Description. The Section 404 activities associated with the proposed project include the construction of a new lock and dam at r.m. 82.2 in the vicinity of Grays Landing, PA and the construction of a new larger lock landward of the existing lock at Lock and Dam 8 at r.m. 90.8 in the vicinity of Point Marion, PA.

c. Authority and Purpose. Study authority for this feasibility report which will be sent to Congress for construction authorization was adopted by the House of Representatives by a resolution dated 23 September 1976. The purpose of the project is to ensure the continued operation of the Monongahela River Navigation System without the threat of shutdown due to the failure of Lock and Dam 7 or Lock 8. These structures are both over 50 years old and may fail at any time due to deterioration and wear from normal use.

d. General Description of Dredged or Fill Material. The fill material to be utilized for construction of the Grays Landing Lock and Dam would amount to about 200,000 cubic yards (c.y.) of concrete and 184,500 c.y. of fill for the cofferdams. The construction of a new lock landward of existing Lock 8 would require about 103,100 c.y. of fill for the cofferdams. None of the new lock at Lock and Dam 8 would fall within the actual riverbed since it would be constructed on dry land next to the existing lock. The fill material to be used in the cofferdams would be obtained from a clean upland source.

e. Description of the Proposed Discharge Site. Approximately 4.9 acres of river bottom area would be permanently covered by the new Grays Landing Lock and Dam. However, removal of existing Lock and Dam 7 would expose 2.6 acres of river bottom leaving a net loss of 2.3 acres. The discharge of fill material would occur only during the construction phase of the project, expected to be three construction seasons. The river bottom area covered by the construction of a new Lock 8 would not be affected since it would be constructed primarily where there is now dry land. However, about one acre of river bottom would be disturbed through dredging required to provide sufficient depth for lock approach.

f. Description of Disposal Method. Standard construction practices would be used for the locks and dams. Sheet pile cofferdams would enclose

the areas utilized for construction which would be completed in the dry. The cofferdams would be constructed by driving sheet pile cells into the river bottom which would then be filled with a granular material obtained from a clean upland source. Afterwards, a one-foot thick concrete cap would be placed over the fill for stabilization. Riprap would be placed along the right bank from river mile 83.2 to 84.9 below ordinary high water to provide bank stabilization. The riprap would consist of broken concrete obtained from the demolition of Lock and Dam 7.

2. FACTUAL DETERMINATION

"Factual Determinations" as required by Section 230.11 of the EPA final guidelines of 24 December 1980 include the following:

a. Physical Substrate Determinations. Changes to the physical substrate would occur through the construction of the Grays Landing Lock and Dam and through the dredging of the upper and lower approaches for the new lock at Lock and Dam 8. The removal of Lock and Dam 7 would expose 2.6 acres of previously covered river bottom, and the new dam at Grays Landing would permanently cover 4.9 acres. The 15-foot pool raise between river mile 85, Lock and Dam 7, and the site of the new dam at river mile 82.2 would add an additional 58 acres of benthic habitat. Therefore, the net gain in benthic habitat would be 55.7 acres. About one acre of river bottom within the approaches to the new Lock 8 would be deepened to permit sufficient depth for tows.

b. Water Circulation, Fluctuation and Salinity Determinations. Water chemistry, odor, taste, dissolved gas levels, nutrients and eutrophication would not be affected by the placement of fill materials. Water clarity and color may be temporarily affected during driving of sheet piles for the cofferdam cells and the removal of Lock and Dam 7. Current patterns, flow, velocity, and the hydrologic regime of the river would change temporarily during construction in the immediate vicinity of the cofferdams. Partial obstruction of river flows by the placement of cofferdams would increase backwater effects 8 to 10 miles upstream to Lock and Dam 8 during high flows. Salinity is not a consideration since the Monongahela River is freshwater.

c. Suspended Particualte/Turbidity Determinations. Turbidity levels would be expected to rise in the Monongahela River during construction of the cofferdam cells. These increased levels would slightly affect light penetration and aesthetics in the immediate vicinity of the construction activities but would return to preconstruction levels upon cessation of the work. Dissolved oxygen depletion in the deeper areas of the river (greater than 30 feet deep) may occur for short periods. Pathogens would not be affected by the construction activities. The fill material would be obtained from a clean upland source, therefore, toxic metals and organics would not be present. Consequently, effects on the chemical and physical properties of the water column would be insignificant. Primary production

and suspension/filter feeders would not be affected; sight feeders may be temporarily affected in the immediate project area during the construction and removal of the cofferdams. Since the fill material would be confined within the sheet pile cofferdams and/or concrete forms, turbidity increases would be minor. The effect on the biota of the Monongahela River is considered to be insignificant.

d. Contaminent Determinations. Contaminent determinations are not appropriate because unpolluted fill material would be obtained from a clean upland source and placed within confined circular cofferdams which satisfies the "reason-to-believe" requirements of Section 230.60(b). Therefore, testing of the fill material for chemical-biological interactive effects is not warranted. The concrete used for the proposed project would also meet the exclusion criteria because it would be formed and set inside of the cofferdams before being exposed to the water, thus minimizing the potential for contamination.

e. Aquatic Ecosystem and Organism Determinations. The proposed project would cause a net gain of 55.7 acres of benthic habitat. Plankton, nekton and the aquatic food web would not be significantly affected. The fill activities would not affect any special aquatic sites, and there are no endangered or threatened species in the project area. Three small palustrine emergent wetlands totalling 1.71 acres would be affected by disposal operations.

f. Proposed Fill Site Determinations. Proposed fill site determinations for construction of the project indicate that, because of the method of placement within or behind cofferdams in the dry, the work would not have a significant effect on the water column. Placement of fill material into the river would not violate any State water quality standards. Minor turbidity increases are not expected to increase water filtration costs for municipalities which would utilize water from the project reach. The nearest water intakes are the Borough of Masontown's at river mile 79.2, three miles below the Grays Landing site, and Dilliner's municipal water intake 2.8 miles below Lock and Dam 8. Impacts on recreational fisheries would be negligible. There are no commerical fisheries, parks, or other designated natural areas that would be affected by the proposed construction.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. No cumulative effects to the aquatic ecosystem of the Monongahela River can be attributed to the fill activities associated with the construction of the Grays Landing Lock and Dam or a new Lock 8.

h. Determinations of Secondary Effects on the Aquatic Ecosystem. There would be no significant, adverse secondary impacts on the aquatic ecosystem as a result of the implementation of the proposed plan.

3. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

a. Adaption of the Section 404(b)(1) Guidelines to this Evaluation. No significant adaptions of the guidelines were made relative to this evaluation.

b. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem. A detailed discussion of alternative plans considered for the replacement of Lock and Dam 7 and Lock 8 is contained in the MAIN REPORT.

The plan that would cause the least environmental damage would be a no action alternative which, as explained in the MAIN REPORT, would only rehabilitate the existing structures. However, the plan to build a new lock at 8 and a new lock and dam at river mile 82.2 was selected because, commensurate with the National Economic Development objective, it would yield greater economic benefits. The proposed fill site (i.e. location of the new locks and dam) was selected based on approach conditions and economics.

c. Compliance with Applicable State Water Quality Standards. The proposed project complies with all state water quality standards.

d. Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act. The fill operations would not violate Section 307 of the Clean Water Act.

e. Compliance with the Endangered Species Act of 1973. There are no Federally listed or proposed threatened or endangered species or critical habitat in the project area.

f. Compliance with Specified Protection Measures for Marine Sancturies Designated by the Marine Protection; Research and Sanctuaries Act of 1972. Not applicable.

g. Evaluation of Extent of Degradation of the Waters of the United States. The proposed placement of fill material would not result in any significant adverse impacts on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife and special aquatic sites. The life stages of aquatic and other wildlife would also not be significantly affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values would not be expected to occur.

h. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem. Appropriate steps to minimize potential adverse impacts of the discharge on the aquatic ecosystem of the Monongahela River include use of clean fill material obtained from an unpolluted upland source and placement in the dry and/or within confined areas. In addition, the Contractor(s) placing the fill material will be governed by detailed contract specifications to prevent environmental pollution and damage as a result of the construction operations.

4. COORDINATION

Coordination of studies leading to completion of the Section 404(b)(1) Evaluation are described in SECTION VI, paragraph 2. of the Final EIS. A Draft EIS containing a Preliminary Section 404(b)(1) Evaluation was sent on 21 September 1983 to all parties as noted on the mailing list in SECTION VI, paragraph 4. of the Final EIS. The District did not receive any objections or adverse comments concerning the Preliminary Section 404(b)(1) Evaluation.

Evaluation Responsibility.

a. This evaluation was prepared by: LARRY E. MUSKOVITZ

Position: Biologist
Date: 1 Dec 15, 1983

b. This evaluation was reviewed by: JAMES K. PURDY

Position: Chief, Environmental Studies Branch
Date: 15 DEC. 83

On the basis of the guidelines, the proposed disposal sites for the discharge of fill material are specified as complying with the requirements of these guidelines.

Date: 15 Dec 1983

John L. Richards
Lt Colonel, Corps of Engineers
District Engineer

MONONGAHELA RIVER NAVIGATION SYSTEM

PENNSYLVANIA AND WEST VIRGINIA

LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

APPENDIX L

PUBLIC INVOLVEMENT

U.S. Army Engineer District, Pittsburgh
Corps of Engineers
Pittsburgh, Pennsylvania

JANUARY 1984

MONONGAHELA RIVER NAVIGATION SYSTEM
PENNSYLVANIA AND WEST VIRGINIA
LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

APPENDIX I.
PUBLIC INVOLVEMENT

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EXHIBITS

Number	Title
1	PUBLIC INFORMATION FACT SHEET, AUGUST 1983
2	MAILING LIST
3	PUBLIC INFORMATION FACT SHEET, SEPTEMBER 1983
4	OFFICIAL TRANSCRIPT OF PUBLIC MEETING
5	NEWS ARTICLES (IN DATE ORDER)
6	LETTERS, STATEMENTS AND RESOLUTIONS

APPENDIX L

PUBLIC INVOLVEMENT

1. INTRODUCTION

The public involvement program for the Locks and Dams 7 and 8 Feasibility Study was an important element for several reasons. First, considering the number of previous studies of these facilities, the District recognized the need to clarify to the public the Corps' involvement in still another study. Second, through this program, the District provided opportunities for all interested persons to become knowledgeable about the study's progress. Third, certain activities within the program assisted in identifying the public's concerns about alternative actions being considered, particularly the advantages or disadvantages of each alternative.

This Appendix contains a chronology of public involvement events, describes materials prepared for and distributed to the public, and generally explains the District's approach to providing opportunities for public interaction.

2. PUBLIC INVOLVEMENT PROGRAM

a. General. For the most part, public involvement efforts prior to the initiation of this feasibility study consisted primarily of interagency coordination and discussions with representatives of private industry. During the feasibility study, the District reestablished contacts with key Federal, State and local agencies, as indicated later in this Appendix.

An initial Public Information Fact Sheet, which served as an advance notice of proposed events, was mailed in August 1983 to all parties on the master mailing list. A second Fact Sheet, containing the announcement of four "Information Centers" and the public meeting, was distributed shortly after.

b. Public Involvement Activities.

(1) The District maintained close coordination with other governmental agencies interested in the Locks and Dams 7 and 8 Feasibility Study. These included:

(a) Federal Agencies:

US Department of Transportation
US Department of Agriculture, Soil Conservation Service
US Environmental Protection Agency
US Department of Commerce
Advisory Counsel on Historic Preservation
US Department of Interior
US Department of Housing and Urban Development
US Department of Health and Human Services

(b) State Agencies:

1 Pennsylvania

State Clearinghouse
Department of Environmental Resources
State Historic Preservation Officer
Fish Commission
Game Commission
Department of Transportation

2 West Virginia

Office of Federal-State Relations, State Clearinghouse
Department of Natural Resources
State Historic Preservation Officer
Department of Highways

(c) Local Officials:

Fayette County Commissioners (PA)
Greene County Commissioners (PA)
Monongalia County Commissioners (WV)
City of Morgantown (WV)
Borough of Point Marion (PA)
Borough of Greensboro (PA)
Fayette County Planning Commission
Greene County Planning Commission
Monongalia County Planning Commission

(2) The August 1983 Public Information Fact Sheet generally summarized the history of the development of the Monongahela River Navigation System, including an explanation of prior studies and reports (EXHIBIT 1). This Fact Sheet was mailed to a list of over 1,900 names (EXHIBIT 2). The mailing list was subsequently expanded as the public was made aware of the study.

To announce the upcoming Information Centers, as well as the public meeting, a second Fact Sheet was prepared and distributed in September 1983 (EXHIBIT 3). In addition to these announcements, this Fact Sheet contained a summary of the alternative plans which had to be evaluated for each site, along with the advantages and disadvantages of each.

(3) Prior to the public meeting, the District established four "Information Centers", where interested persons could review the draft report and discuss specific issues with staff members. For the convenience of area residents and others, the Centers were located in Pittsburgh, PA, Morgantown, WV, Greensboro, PA and Point Marion, PA. The District took special care to avoid a format for these Centers which would give the

appearance of a public meeting. A wide variety of graphics, maps and other visuals were displayed, and a total of 77 persons visited the four Information Centers.

(4) The public meeting held on 19 October 1983 was widely publicized through mailings and media coverage and was attended by over 80 persons. Congressional interests and representatives of governmental agencies, business and industry, along with local residents, presented both formal and informal statements about the tentatively selected plans for replacement of the facilities. Government and industry representatives, as well as those who use the Monongahela River to transport coal and other products, totally agreed with the Corps' proposed plans for the structures. However, some property owners expressed great concern about potential flooding along the Monongahela River as a result of the replacement of Lock and Dam 7 at Grays Landing.

A transcript of the meeting, as well as an attendance list and presented statements, is attached as EXHIBIT 4.

(5) Media coverage for the feasibility study was handled primarily by local media entities. For the most part, newspaper articles appeared near the time set for the Information Centers and the public meeting. Reporters from local newspapers visited the Centers and attended the public meeting. In addition, the study manager was interviewed by the reporter from WBOY-TV, Morgantown, WV and the interview was aired over the late night broadcast, 17 October 1983.

EXHIBIT 5 contains a sampling of the news articles which were published as follows:

Point Marion News Point Marion, PA	6 October 1983
Pittsburgh Post Gazette Pittsburgh, PA	7 & 19 October 1983
Herald-Standard (Evening Standard) Uniontown, PA	16, 19, 20, 21, 23, 24 October 1983
Pittsburgh Press Pittsburgh, PA	18 October 1983
Dominion Post Morgantown, WV	18 October 1983

Butler Eagle Butler, PA	19 October 1983
Tribune Review Greensburg, PA	20 October 1983
The Derrick Oil City, PA	20 October 1983
Daily Herald Monongahela, PA	20 October 1983
Democrat Messenger Waynesburg, PA	20 October 1983
Telegraph Brownsville, PA	20 October 1983
Observer Reporter Washington, PA	21 October 1983
The Valley News Dispatch New Kensington, PA	26 October 1983

(6) A number of letters were received from various interests prior to and shortly after the public meeting. These included some formal statements in addition to those presented at the meeting. Generally, the letters endorsed the Corps' selection of a tentative plan for the structures. Copies of these letters are contained in EXHIBIT 6.

3. ASSESSMENT OF THE PUBLIC INVOLVEMENT PROGRAM

The District attempted to develop a public involvement program which would provide sufficient and timely information to publicize the details of proposed actions with regard to Locks and Dams 7 and 8. To this end, a different kind of activity, Information Centers, was introduced to complement the traditional fact sheets and public meeting. These Centers were established to insure that study information reached as many interested persons as possible. The idea was to provide an informal setting where the public could review the draft report and share their concerns with Corps representatives. This activity was well received by the public and accomplished its purpose. In addition, information shared at the Information Centers provided the District with useful feedback.

Both fact sheets adequately explained the background and status of the feasibility study; there were a number of requests for additional copies of the September Fact Sheet.

The public meeting attracted an informed and vocal audience. As a result of the concerns expressed at the meeting, a group of local residents requested another meeting with the Corps to further clarify issues relating to the proposed improvements at Locks and Dams 7 and 8. This meeting was held on 22 November 1983 in Greensboro, PA. District representatives answered a number of questions to the apparent satisfaction of those in attendance.

Considering the variety of public involvement activities offered and the public's response to these activities, the public involvement program met the needs of the public and the District.

MONONGAHELA RIVER NAVIGATION SYSTEM

PENNSYLVANIA AND WEST VIRGINIA

LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

EXHIBIT 1
PUBLIC INFORMATION FACT SHEET
AUGUST 1983

August 1983

US Army Corps of Engineers
Pittsburgh District

Public Information Fact Sheet
Monongahela River Navigation System Locks and Dams 7 and 8

The Monongahela River carries the largest volume of commercial traffic of the three rivers within the Pittsburgh District and ranks as one of the great industrial waterways of the world. Navigation is currently available throughout the entire length of the river by means of nine lock and dam structures (see map on page 2). Since the acquisition of the Monongahela Navigation Company by the Federal Government in 1897, the U.S. Army Corps of Engineers has developed, operated and maintained the system to provide a smooth flow of waterway traffic.

Lock and Dam 7

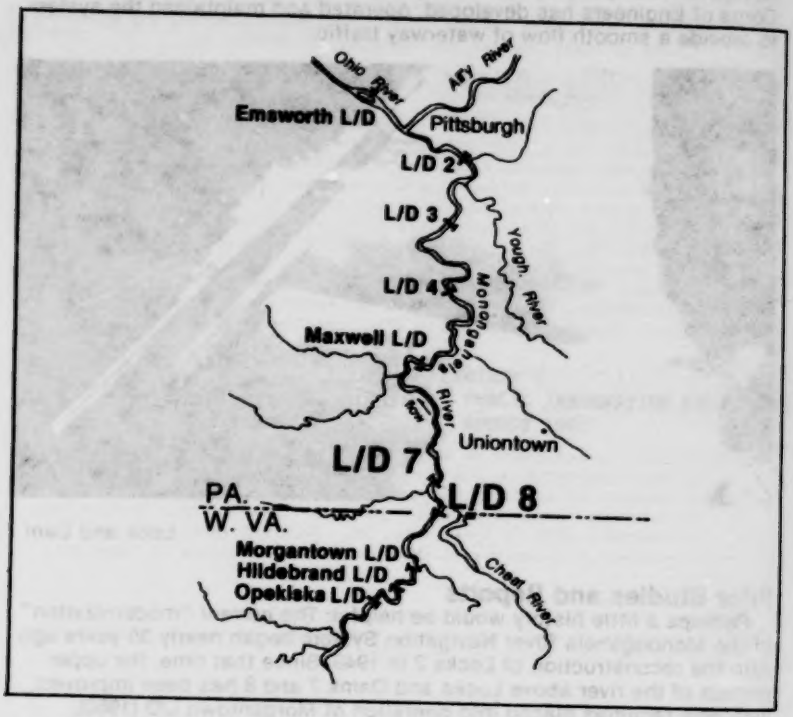
Prior Studies and Reports

Perhaps a little history would be helpful: The current "modernization" of the Monongahela River Navigation System began nearly 35 years ago with the reconstruction of Locks 2 in 1949. Since that time, the upper portion of the river above Locks and Dams 7 and 8 has been improved, with new facilities placed into operation at Morgantown L/D (1950), Hildebrand L/D (1960) and Opekiska L/D (1964). Each of these facilities

contains single 84' x 600' lock chambers and gated dams. Below Lock and Dam 7, on the middle portion of the river, the new Maxwell L/D was placed into operation in 1964. This structure also contains a gated dam, but unlike the upper river locks, Maxwell has twin lock chambers, each 84' x 720'.

During the 1970's, the Pittsburgh District prepared a report which recommended replacement of Lock and Dam 7 and Lock 8 with larger structures. This report was approved and construction was authorized by the Secretary of the Army under the 1909 River and Harbor Act. This authorization was subsequently cancelled in 1975 because of judicial proceedings involving construction of another navigation structure. Thereafter, the District was directed to develop a report on the need for modification and improvement to the Monongahela River Navigation System.

In January 1981, the District completed an updated and current reconnaissance report. This report amply illustrated the problems that exist within the system. These problems relate primarily to the structural condition of several facilities and that, with increasing traffic demands, the existing structures would be unable to satisfactorily accommodate navigation demands. The reconnaissance report included the recommendation that further in-depth studies of the structures should be undertaken. The feasibility report on Locks and Dams 7 and 8 to be published shortly is a result of that recommendation.



Why the Need for Another Study?

The value of a navigation system lies in its ability to provide safe and reliable service when called upon. To do this, a system has to be structurally sound and of sufficient capacity to accommodate river traffic. Locks and Dams 7 and 8, presently in a state of advanced deterioration, are over 50 years old. In addition, these two structures have smaller lock chambers than any of the seven other facilities on the Monongahela River. While this does not indicate cause for crisis action, changes in the character of the river traffic since the structures were designed (such as increased volume of traffic, growth in tonnage and increased size of tows) together with the deterioration, contribute to the current inefficiencies in the operation of the facilities, and concern for their reliable availability for service.

For these reasons, the District, at the direction of the Congress, has undertaken a feasibility study which has pulled together the results of the number of investigations, including the ones discussed above. This current effort has reviewed the overall condition of Locks and Dams 7 and 8, the level of navigation service they provide and at present, at what level that service should continue.

The product of this study is a draft report which has been completed and will be ready for public viewing this fall.

What Happens Next?

This fact sheet has been prepared as an advance notice of the events to follow. The District plans to announce in a future publication the availability of the draft report, the location where it may be viewed and also the date and place of a public meeting. The second fact sheet will also explain the feasible alternative plans developed by the District which could be implemented to meet the anticipated public needs in this portion of the navigation system.

After the District has received comments from other agencies and the public about the draft report, a final report, with recommendations, will be submitted for review to our Ohio River Division office, in Cincinnati, Ohio and then to our office in Washington, DC. Ultimately, the report will be transmitted to the Congress for action. During this review period, and before the report is transmitted to the Congress, the District will provide to those persons interested in the study additional opportunities to furnish their views and comments.

What Can the Public Do?

First, be sure your name and address have been included on our mailing list. Next, plan to view the draft report, and also plan to attend the upcoming public meeting.

If you have a question or desire additional copies of this fact sheet, please contact:

Herb Wise, Project Manager
Planning Division
U.S. Army Corps of Engineers
William S. Moorhead Federal Building
Pittsburgh, PA 15222
(412) 644-6848

MONONGAHELA RIVER NAVIGATION SYSTEM

PENNSYLVANIA AND WEST VIRGINIA

LOCKS AND DAMS 7 AND 8
FEASIBILITY STUDY

EXHIBIT 6
LETTERS, STATEMENTS AND RESOLUTIO

DOUG WALGREN
10th District, Pennsylvania

COMMITTEE
ENERGY AND COMMERCE
SCIENCE AND TECHNOLOGY

Congress of the United States
House of Representatives
Washington, D.C. 20515

Washington Office
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Washington, D.C. 20515
(202) [illegible]

District Offices
[illegible]
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222
(412) 391-4979

November 15, 1983

Lt. Colonel Jack Richards
District Engineer, Pittsburgh District
U.S. Army Corps of Engineers
The Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Dear Lt. Colonel Richards:

I am writing to express my interest in the Corps of Engineers' feasibility study of proposed navigation improvements on Lock and Dam 7 and 8 on the Monongahela River.

As you know, the House Public Works Committee has developed legislation, H.R. 3678, authorizing improvements to a number of waterway projects across the country, including Lock and Dam 7 and 8 and the House has approved H.R. 3958, the water resource appropriations bill for 1984 which includes initial funding for these projects. I am pleased to enclose a statement I made on H.R. 3958, which further outlines my views on the need to improve these facilities.

It is my understanding that the Corps' study included three approaches: rehabilitate the existing structures; replace the existing structures with structures of the same size; or replace existing locks and dams with larger facilities. I believe that the third alternative is the best approach. It is also the approach envisioned in the two bills now under consideration in Congress. Building larger facilities in the long term will be the most cost-effective and economically beneficial of the plans studied by the Corps. To merely rehabilitate these two locks or to replace them with locks of the same size would ultimately cost more than constructing new, larger locks because the improved efficiency and larger capacity will lower the the lower cost of transporting materials on the Monongahela River. This would benefit many industries in Western Pennsylvania and have a beneficial ripple effect throughout our economy.

I appreciate the opportunity to comment on your study and look forward to working with you to improve waterway transportation in our area.

Sincerely,

Doug Walgren
Member of Congress

DWgs

Appreciate your help on this.

United States of America

Congressional Record

PROCEEDINGS AND DEBATES OF THE 98th CONGRESS, FIRST SESSION

Vol. 129 WASHINGTON, THURSDAY, OCTOBER 6, 1983 No. 133

House of Representatives

THURSDAY, OCTOBER 6, 1983

IMPROVING WATERWAY TRANSPORTATION

Congressman Doug Walgren

• Mr. WALGREN. Mr. Chairman, it is most important that the Congress act on H.R. 3998, the water resources appropriations bill, to begin the rejuvenation of many waterway facilities across the country, including several affecting my home area of Pittsburgh.

Our waterways and ports are an essential aspect of our transportation network. Our rivers and canals have proven to be one of the cleanest, most efficient, and most economical modes of transportation available. Historically, our waterways have been essential to the birth and development of cities and industries.

Water projects have also played an important role in both protecting and improving our quality of life. Reservoirs have substantially improved our standard of living by providing for the generation of hydroelectrical energy, by creating flood protection for low-lying areas, by providing recreational opportunities, and by supplying our communities, industries, and farms with an abundant supply of clean water.

Pittsburgh is the No. 1 inland port in the country, handling nearly 41 million tons of freight annually. In addition, the entire region surrounding Pittsburgh, including sections of West Virginia and Ohio, handles over 70 million tons of freight annually. The tremendous amount of traffic on the Ohio, Monongahela, and Allegheny Rivers has over loaded outdated lock and dam systems.

Three lock and dam systems included in this bill are particularly in need of repair: the Gallipolis lock and dam, the Gray's Landing lock and dam (No. 7), and the Point Marion lock and dam (No. 8).

The Gallipolis lock and dam is on the Ohio River in West Virginia and Ohio, roughly halfway between Pittsburgh and the Mississippi River. This lock and dam faces two major problems: First, it is located in a river bend making navigation extremely hazardous. There is an average of 10 accidents per year at Gallipolis, sometimes resulting in a complete loss of pool, meaning a serious disruption in traffic and a break in water supply to the public and to industry. The second problem is the rapid deterioration of these locks and their inadequate size. The Gallipolis lock and dam was completed in 1937, to meet the needs of the 1930's. The average tow at that time was between 6 to 10 barges. Today the locks are too small to accommodate the current tows which average between 15 to 20 barges. This creates expensive delays which result in higher prices for products.

The Upper Ohio River Basin is the center of much of the country's steel, coal, and chemical production for which river transportation is essential. This area produced 17.5 percent of the Nation's raw steel in 1980 and employed 108,000 people, contributing $3.24 billion in direct steel incomes. The coal industry employed 31,450 coal miners and transported over 33 million tons of coal through this river system in 1979. In that same year, the coal industry generated $551.1 million in payroll. Projections estimate that by 1990 that payroll will increase to $825.5 million. The chemical industry is also affected by inefficiencies in the system. Nearly 20 percent of the traffic through Gallipolis originates from the chemical companies in Texas and Louisiana. These chemicals are shipped to the Upper Ohio River Basin where they are processed then reshipped throughout the world. The Gallipolis lock and dam is certainly one of the most important and overburdened locks in the country. The plan to build two new locks to replace the old lock would generate a benefit-to-cost ratio of 12.9 to 1.

Lock and dam No. 7 and No. 8 on the Monongahela River were built in 1925 and are to small to handle modern traffic. These locks which measure 56 feet by 360 feet are much smaller than the Morgantown lock and dam 84 feet by 600 feet which lies upstream and the Maxwell lock and dam, 84 feet by 720 feet, which lies downstream creating a bottleneck on the Monongahela River and increasing shipping costs.

The age of these structures presents a problem of increasingly high repair costs. Direct repair costs, traffic delays and downtime are making these locks expensive to use. It is estimated that 99 percent of the traffic on the Monongahela River is coal that is used in steel and electricity production. This relates directly to jobs in the steel and coal industries. Twelve thousands other jobs are directly tied to the transportation of raw material and finished products on this river. Lock and dam No. 7 and No. 8 are clearly inadequate for future commerce. Projections estimate that by 1990, 14 million tons of freight will be shipped through these locks. Recent studies have concluded that if these locks were modernized they would save $750,000 annually in operation and maintenance expenditures for the next 50 years. In addition the plan to replace these locks would create a benefit-to-cost ratio of 5.5 to 1. The moneys used to replace the Gallipolis, Gray's Landing, and Point Marion lock and dam systems would be money well invested. Studies have shown that if major action is not taken to rehabilitate or replace these structures they will only be able to serve a declining amount of traffic after 1990 and could be permanently closed by the year 2000.

These locks and dams are extremely important to the local economies of Pennsylvania, West Virginia, and Ohio. Millions of jobs and billions of dollars in revenue are directly affected by the availability and dependability of transportation on the Ohio, Allegheny, and Monongahela Rivers. This, however, is not a local issue. As the No. 1 inland port and center of America's industrial heartland Pittsburgh has a tremendous effect on the Nation's economy. Certainly the current problem in the coal and steel industries have sent shock waves through our economy. We cannot afford to cripple these industries any further. If these locks and dams are not replaced, we run the risk of damaging these industries permanently. In addition, a total of 19 States depend on these outmoded facilities to transport their raw materials and finished products.

Congress must support cost-effective improvements to these structures in order to save river transportation and help local and the national economies. The money invested in water projects would help other areas of the economy. The steel industry and electric utilities could be significantly stimulated by more efficient transportation. I believe that now is the most important time to start the funding and rebuilding of this country's water transportation system. We cannot afford to let these assets and our economy deteriorate any further.•

United States Department of Agriculture
Soil Conservation Service
Box 985
Federal Square Station
Harrisburg, Pennsylvania 17108

November 17, 1983

Major T. L. Ricer, Acting District Engineer
Corps of Engineers
Department of the Army
Pittsburgh District
William S. Moorhead Federal Bldg.
1000 Liberty Ave.
Pittsburgh, PA 15222

Dear Major Ricer:

Thank you for the opportunity to review and comment on the Draft Feasibility Study Report on Locks and Dams 7 and 8 of the Monongahela River Navigation System.

We agree that such a project is highly desirable to maintain a viable navigational system in the upper Mon Valley in the future. Although such a project will constitute an irretrievable commitment of localized natural resources, it does appear that the least disruptive course of action has been recommended to maintain long-term river transportation.

It does appear that the disposal areas at both proposed sites consist of prime farmland soils. Much of the proposed disposal site for the new lock and dam at Grays Landing (#7) is mapped as Chavies fine sandy loam (Ce-Sheet 39, Insert A, Soil Survey of Fayette Co. - March 1973). Similarly, much of the proposed disposal area for the new lock and dam at Point Marion (#8) is mapped as Huntingdon silt loam (Hu - Sheet 164, Greene-Washington Soil Survey - 1983). However, according to current land use maps and aerial photography, most or all of this land is in grassland, brush or wooded condition except for the portion which extends into West Virginia. This tract is labeled "Cultivated."

The proposed increase in normal pool level at lock and dam #7 may cause inundation of some Philo silt loam (Ph Sheet 53, Soil Survey of Fayette Co. - March 1983) along Georges Creek. The Draft Environmental Impact Statement EIS-3 Rev 9/16 (Blue Sheets) indicates "N/A" regarding prime or unique agricultural lands.

Volume 1, page 60 of Main Report, indicates approximately 39,000 cubic yards of excavated material and about 188,000 cubic yards of dredged material at lock and dam #7 will be disposed of in the disposal area. Likewise, a large volume of materials will be disposed at lock and dam #8. Much of this site is to be filled to a depth of 4 feet. It appears that a detailed erosion and sedimentation control plan will be needed for both disposal sites. These plans should address both temporary control measures (during disposal) and permanent control measures at these sites.

Page 61 of the above report indicates several public utilities and private facilities will need to be relocated. Detailed erosion and sedimentation control plans should be prepared for each of these specific sites.

Also, site specific erosion and sedimentation control plans should be prepared for the actual construction sites at both locations and for both streambanks.

James H. Olson
State Conservationist

U.S. Department of Housing and Urban Development
Philadelphia Area Office, Region III
Curtis Building
625 Walnut Street
Philadelphia, Pennsylvania 19106

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ajor T.L. Ricer
cting District Engineer
ittsburgh District COE
illiam S. Moorhead Federal Building
000 Liberty Avenue
ittsburgh, PA 15222

ear Major Ricer:

We have examined the Draft Environmental Impact Statement for Locks and
ms 7 and 8 of the Monongahela River Navigation System, Pennsylvania and West
irginia, and have no comments to offer.

Sincerely,

Kenneth J. Finlayson
Regional Administrator, 3S

United States Department of the Interior

OFFICE OF THE SECRETARY
MID-ATLANTIC REGION
Custom House, Room 502
Second and Chestnut Streets
Philadelphia, Pennsylvania 19106
November 28, 1983

ER 83/1194

Lt. Colonel John L. Richards
District Engineer, Pittsburgh District
U.S. Army Corps of Engineers
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Dear Colonel Richards:

The Department of the Interior has reviewed the Draft Environmental Statement (DEIS) and Draft Feasibility Report for the Locks and Dams 7 and 8 replacement study, Monongahela River Navigation System, Pennsylvania and West Virginia. The following comments are keyed to our area of interest and expertise.

General Comments

Generally, the DEIS and supporting documents adequately address impacts on mineral resources, mining activities and fish and wildlife resources in the proposed project area. We concur with and are pleased to see the inclusion of fisherman access areas at the dam locations and also the possibility of installing boat launching areas within the project area.

Specific Comments

Main Report, Page 60, Pool Preparation

Section g states that "all land would be cleared of trees and other growth. . ."

If a portion of these trees and all of the shrubs and brush can be left standing or cut off and cabled to their stumps, aquatic habitat for many fish species in the river will be improved. This would also mean less money spent on clearing and would be more consistent with Section i, paragraph 2 on page 62 and in paragraph 3, page EIS-29, which states that mitigation for loss of shallow water habitat could include". . . selective clearing of trees and brush."

Page EIS-12, Section 1, Wetlands

The three small palustrine emergent wetlands located near Lock and Dam 8 are not dominated by cattails, and their small size does not necessarily make them unimportant (see Appendix K, page N, paragraph 2 and page 21, paragraph 1). One of the wetlands (classified as palustrine scrub shrub) contains a variety of emergents and shrubs including buttonbush, umbrella sedge, and spike rush. The other two emergent wetlands are apparently degraded by acid mine drainage. Compensation for project-related wetland losses are being addressed in the Fish and Wildlife Service's Fish and Wildlife Coordination Act report which will be sent to you by December 1, 1983.

Cultural Resources

The report indicates that a cultural resources reconnaissance of the tentatively selected project area located five sites potentially eligible for listing in the National Register of Historic Places. The document also indicates that the Pittsburgh District Corps of Engineers plans to proceed with more intensive survey and evaluation upon authorization of a specific plan. This approach would logically lead to compliance with Section 106 of the National Historic Preservation Act of 1966. The draft environmental impact statement does document consultation with the Pennsylvania State Historic Preservation Officer on the potential of the project to adversely affect cultural resources.

Recreational Resources

The document indicates adequate consideration has been given to providing for public recreation activities within the project boundaries. We urge continued consultation with State and local park and recreational agencies regarding any potential adverse impacts on existing and planned recreational facilities and uses at the project site.

National Park System Resources

The National Park Service is preparing additional comments concerning the relationship of the proposed project to the Friendship Hill National Historic Site, located adjacent to Lock and Dam 7. We will provide those comments to you in the near future.

Thank you for the opportunity to comment on this proposal.

Sincerely,

Anita J. Miller

Anita J. Miller
Regional Environmental Officer

United States Department of the Interior
OFFICE OF THE SECRETARY
MID-ATLANTIC REGION
Custom House, Room 502
Second and Chestnut Streets
Philadelphia, Pennsylvania 19106

ER 83/1194

November 30, 1983

Lt. Colonel John L. Richards
District Engineer, Pittsburgh District
U.S. Army Corps of Engineers
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Dear Colonel Richards:

The following comments are a supplement to our November 28, 1983 letter, on review of draft environmental statement and draft Feasibility Report, Locks and Dams 7 and 8 Replacement Study, Monongahela River Navigation System, Pennsylvania and West Virginia.

National Park System Resources

Lock and Dam 7 is located immediately adjacent to Friendship Hill National Historic Site, the home of Albert Gallatin. The tentatively selected alternative favors the construction of a new, larger lock chamber landward of the existing chamber at Lock and Dam 8, and construction of a new lock and dam about two and one-half miles downstream from Lock and Dam 7, to be known as the Gray's Landing Lock and Dam, with the subsequent removal of Lock and Dam 7. This alternative appears to be the most cost-effective alternative to the region. With proper removal of Dam 7, there would be no direct adverse impacts to Friendship Hill National Historic Site. The water level adjacent to the park would remain at the existing level. With close cooperation of the Corps, implementation of the proposed plan could significantly further the development of Friendship Hill National Historic Site in accordance with the Park's General Management Plan.

Gray's Landing Lock and Dam will raise the pool level about 15 feet, from the area of the park downstream from existing Lock and Dam 7, for about 500 feet, and up Georges Creek near the park. Upon completion of Gray's Landing Lock and Dam, the dam at 7 would be removed, although the dam abutment would be left. While raising the pool level will have little effect on park lands, it will submerge several archeological sites related to the Historic Site located outside the park along Georges Creek, such as the glassworks, gun factory and one or two mill sites. The Corps has recognized this impact. The Pittsburgh District, Corps of Engineers, is working with the State Historic Preservation Officer toward an acceptable scope of work for further archeological investigations. Since the knowledge gained from excavating these sites would primarily benefit Friendship Hill National Historic Site, the National Park Service proposes to work very closely with the Corps on the salvage operation,

supervising the operation if possible. It would be the Corps responsibility to provide the necessary funding needed to perform the salvage and to obtain permission from the landowners to excavate.

The tentatively selected plan calls for the concrete from the demolished dam and lock to be placed along the river banks, below the new water level, to stabilize the banks and provide better fish habitat. It appears from the document, that a small amount of the concrete would be placed on park lands. With careful planning, the National Park Service would have no objections. The plan also describes the need to dredge about 39,000 cubic yards of material from the vicinity of the dam. The dredged material is to be placed "nearby and above the 100 year floodplain." We recommend, that in addition to the removal of the dam, the long riprap dike, between the dam abutment and the railroad tracks, should be removed to restore the site to a more normal condition. The plan does not address this.

Friendship Hill's General Management Plan encourages the development of a modest river front recreation area on the park lands near the dam. While the General Management Plan describes access to this area by using an old railroad underpass near Georges Creek (and obtaining title to about four acres in this area), that underpass will no longer be dependable with the new pool level. The dredge material from the river's edge could be hauled to some other location, or placed "nearby" on park property. The heavy equipment to be used would require a primitive road, which the National Park Service could permit within its boundary. The National Park Service proposes that the dredge material could be placed on park lands to make the road grade and railroad crossing into a permanent access to serve this recreational development. Stone from the riprap dike could be used to line the face of the road grade, especially at its base, near the floodplain. These ideas were mentioned by the National Park Service Area Manager to the Corps representatives during the recent public hearing. The National Park Service offers its cooperative effort toward a mutually acceptable plan.

The particulars of such a plan to use the dredge and dike material for a road grade would require that the Corps of Engineers do a number of things:

1. The Corps should do the needed engineering and site planning in cooperation with the National Park Service.

2. The Corps should obtain permission from the Monongahela Railroad to install a permanent crossing to service the development.

3. The Corps apparently owns fee title to about 2.4 acres surrounding the dam abutment, lands the National Park Service once thought were within the park (and are within the authorized boundaries). Since it appears the Corps would no longer have need for this land, after removal of Lock and Dam 7, we request that title be passed to the National Park Service once the dam project is completed. This would be in keeping with the enabling legislation for the park.

4. The Corps should assure that the Pennsylvania Fish Commission works closely with the National Park Service to plan habitat development and recreational access to the river, within the park boundaries and on lands adjacent to the park.

We recommend that the above concerns be discussed further with Area Manager William Fink at the Friendship Hill Historic Site. His telephone number is (412) 725-9190. All correspondence on the project should be addressed to the Superintendent, to the Attention of William Fink.

Superintendent Robert L. Warren
Fort Necessity National Battlefield/
Friendship Hill National Historic Site
The National Pike
Farmington, Pennsylvania 15437.

Sincerely,

Anita J. Miller
Regional Environmental Officer

cc:
Dr. Larry E. Tise
State Historic Preservation Officer
Pennsylvania Historical and Museum Commission
P.O. Box 1026
Harrisburg, Pennsylvania 17120

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

NOV 25 1983

Mr. T. L. Ricer
Major Corps of Engineers
Acting District Engineer
Pittsburgh District, Corps of Engineers
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 1522

RE: Comments-Draft Feasibility Study and Draft Environmental Impact Statement; Locks and Dams No. 7 and No. 8 in the Monongahela River Navigation System, Pennsylvania and West Virginia (D-COE-D32028-00)

Dear Mr. Major Ricer:

Pursuant to authority granted to the USEPA under Section 309 of the Clean Air Act (P.L. 91-604) we reviewed the referenced study and draft environmental impact statements (DEIS) for Locks and Dams No. 7 and No. 8. Our primary concerns during the review were to evaluate the implementation of the USACOE proposal for new construction and rehabilitation of the existing locks and dams, and to assess any impacts which this proposed project could have on the upper Monongahela River and its adjacent areas. Our comments are provided for your consideration and inclusion in the final environmental impact statement.

We have initially rated this project as LO-2 in the USEPA reference category. The feasibility study, appendices, and draft impact statement adequately identified and sufficiently addressed those problem areas which could potentially result from the development and implementation of this project. We believe that this proposed project could be easily implemented without adversely affecting the natural resources of the area or endangering the aquatic/terrestial biota and habitats.

We have considered your presentation of the probable alternatives, both structural and non-structural, from a number of perspectives. We have concluded that the tentatively selected plan (also the NED Plan) locating (1) a new 84x720 feet lock and fixed crest dam at r.m. 82.2. (No. 7-Grays Landing), and (2) a new 84 x 720 feet lock at r.m. 90.8 (No. 8-Point Marion) is acceptable. Neither of the other major project alternatives - the replacement of Locks and Dams No. 7 and No. 8 with one new lock and gated dam, by the extensive rehabilitation of existing structures - would provide an equivalent level of maximizing operational benefits while minimizing adverse environmental impacts during implementation.

Our acceptance of the selected plan is dependent upon a number of conditions, which should be included and/or amplified in the final environmental impact statement:

62-511 0 - 86 - 8

(a) The Corps of Engineers should develop a mitigation plan which incorporates, at the least, those recommendations made by the US Fish and Wildlife Service, in their draft report of September 1983 (pp. 2, 26-30; Appendix K, Vol. 3 USACOE). The formal mitigation plan prepared with the cooperation of USFWS and the Pennsylvania Fish Commission should be submitted to our agency upon its completion, for our review and comment.

(b) The final EIS should provide detailed explanation for the disposal of spoil from excavation and dredging, including specific locations of storage areas.

(c) The relocation of Lock and Dam No. 7 to a point further downstream will create a new larger pool. This new pool will raise 2.8 miles of river by 15 feet. While the draft EIS discussed the impact of the elevation change on existing facilities, in this reach, the final EIS should also consider the impacts to the aquatic environment of both Georges and Jacobs Creeks.

(d) The draft EIS briefly discussed the Corps' hydropower development at both Lock and Dam No. 7 and No. 8. The conclusion was that "...the cost of installation exceeded the hydropower benefits..." (p. 43, Feasibility Study, USACOE). However, there are preliminary license application to the Federal Energy Regulatory Commission to privately develop hydropower facilities at both site. The final EIS should include discussion of these hydropower proposals.

Thank you for the opportunity to review and comment upon these studies. If there are additional questions or comments, please contact Mr. Robert C. Runowski (215) 597-8335 of my staff.

Sincerely,

Henry P. Brubaker

Henry P. Brubaker, Chief
Analysis and Services Section

cc: Jack Miller, PFC
Charles, Kulp, USFWS
N. DeBenedictis, PADER
James Butch, USEPA Regional III

Advisory Council On Historic Preservation

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

NOV 23 '83

Major T. L. Ricer
Acting District Engineer
Pittsburgh District, Corps of Engineers
Department of the Army
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222

Dear Major Ricer:

On October 31, 1983, we received your letter, accompanied by a Draft Feasibility Study, concerning Locks and Dams 7 and 8 withic the Monongahela River Navigation System, Pennsylvania and West Virginia.

The Draft Environmental Impact Statement (DEIS), attached to the Draft Feasibility Study, indicates that in 1975 a cultural resources reconnaissance identified five sites that would be affected by the tentatively selected plan. The Pennsylvania State Historic Preservation Officer's (SHPO's) letter of July 1, 1983, also lists significant archeological sites that are located in or near the project's potential site and suggests that others may exist. In addition, the DEIS notes that Friendship Hill, a property included in the National Register of Historic Places, borders Pool 7 just upstream from Lock and Dam 7.

We appreciate your efforts to research these properties. Pursuant to the Council's regulations, "Protection of Historic and Cultural Resources" (36 CFR Part 800), we recommend that you continue to study and identify historic and archeological properties within the area of the undertaking's potential environmental impact and, in consultation with the Pennsylvania SHPO, determine which (additional) properties may meet the National Register Criteria, assess the effect of the undertaking on these properties, and, if appropriate, afford the Council an opportunity to comment.

Thank you for your continued cooperation. If we can be of assistance, please contact Hat Russell or Mike Quinn at (202) 786-0505.

Sincerely,

John L. Klima
Chief, Eastern Division
of Project Review

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
P.O. Box 2063
Harrisburg, Pennsylvania 17120
717-783-1566

November 17, 1983

Department of the Army
Pittsburgh District, Corps of Engineers
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222

Dear Sirs:

We have reviewed the Draft Feasibility Study and Environmental Impact Statement for the Monongahela River Navigation System Locks and Dams 7 and 8.

We believe that the replacement and enlargement of Locks 7 and 8 is necessary to alleviate serious bottlenecks within the regional river transport system and accordingly support the plan that has been selected.

Because both of the project sites are currently being investigated for possible hydroelectric development, we would urge the Corps of Engineers to coordinate with all concerned parties to avoid any possible conflicts.

We identify fourteen (14) sources of public water supplies in Pennsylvania that might suffer adverse affects due to the project. Consideration must be given to these water supplies where elevations are to be changed or where construction might cause siltation and degradation of the raw water supply.

Thank you for the opportunity to review this project.

Sincerely,

Richard J. Pastor

Richard J. Pastor, Director
Secretary's Office of Policy

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
WILLIAM PENN MEMORIAL MUSEUM AND ARCHIVES BUILDING
BOX 1026
HARRISBURG, PENNSYLVANIA 17120

Re PD - EIS PD-R JAP files

October 14, 1983

T. L. Ricer
Major, Corps of Engineers
Pittsburgh District
Wm. S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Re: Monongahela River Navigation System, Locks & Dams 7 and 8
File No. ER 83-051-1301

Dear Major Ricer:

Thank you for submission of the Draft Feasibility Study concerning the above-named project, which we received on 23 September. We have reviewed these documents and would like to make the following comments.

To the best of our knowledge there are no National Register eligible or listed historic or archeological properties in the area of the proposed work at Lock & Dam #8. Therefore, this project should have no effect upon such resources. Should the applicant become aware, from any source, that historic or archeological resources are located at or near the project site, please contact the Division of Planning & Protection.

There is a high probability that archeological resources may be affected by the construction of the Grays Landing Lock & Dam and the subsequent inundation of land between that site and the present Lock & Dam #7. A survey or limited testing of the area should be undertaken to locate potentially significant archeological resources. Guidelines and instructions for this phase are available from this office. If you have any questions please contact Kurt Carr at (717) 783-5216.

This phase of the project may also affect a number of historic properties that are potentially eligible for listing in the National Register of Historic places. The significance of any docks, tipples, or other structures that will be demolished, moved, altered, or otherwise affected must be evaluated. This also applies to any highway or railway bridges and buildings. If you have any questions concerning this phase of work please contact Patrick W. O'Bannon of this office at (717) 783-8946.

Sincerely,

Donna Williams

Donna Williams, Chief
Division of Planning & Protection
Bureau for Historic Preservation

PRESIDENT
MAYOR EDWARD A. POLITAN
PORT VUE

1ST VICE PRESIDENT
MAYOR FRANK COMPARATO III
CHURCHILL

2ND VICE PRESIDENT
MAYOR DAVID MORRIS
TAYLOR

PAST PRESIDENTS
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PENNSYLVANIA
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EDUCATION
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PUBLIC RELATIONS
MAYOR JAMES JOYCE

STATE CHAPLAIN
MAYOR REV. JOHN LEHR
WELLSVILLE

STATE SOLICITORS
GEORGE B. GOBEL
DR. OLIVER H. HOWELL

STATE OFFICE HEADQUARTERS
5150 BRIGHTWOOD ROAD, SUITE 201, BETHEL PARK, PA 15102
Area Code 412 / 833-4100
Area Code 412 / 833-7060

November 8, 1983

TO: UNITED STATES ARMY CORPS OF ENGINEERS
on Lock and Dams 7 and 8 Feasibility Study

PRESENTED BY: THE PENNSYLVANIA STATE MAYORS' ASSOCIATION

Dear Sirs,

The Pennsylvania State Mayors' Association's primary objective is to encourage the betterment of the Commonwealth of Pennsylvania both environmentally, and economically for its citizens. As such the Association wishes to submit their position on the referred to feasibility study.

Because the Monongahela River is a vital link in the transportation system of Southwestern Pennsylvania and because it provides numerous jobs in this area, we, as members of the Association, encourage the Corps of Engineers to promote Alternative No. 3 which calls for the replacements of Locks and Dams 7 and 8 with a new system of locks and dams at a proposed cost of $157,630.00. It is the Association's position that if this Alternative is accomplished, it will sure the economic development of Southwestern Pennsylvania and assure the stability of the current economy of our area.

In addition to what has already been stated, the Mayors' Association feels that with the installation of larger lock and dam facilities, these systems will more adequately address

the larger tows that are currently being used on the river and which are currently handicapped by the antiquated facilities currently located at sites 7 and 8. In addition, Alternative No. 3 would result in the least negative impact and would result in the least disruption for the residents in this particular area.

In conclusion, the Pennsylvania State Mayors' Association encourages the Army Corps of Engineers to begin taking steps to achieve this end as soon as possible so the economy of Southwestern Pennsylvania and the surrounding areas may begin to realize the benefits of a new and larger lock and dam system on the Monongahela River.

The Honorable Fred P. McLuckie
Mayor of Charleroi
Chairman, Resolution Committee
on Locks and Dams

The Honorable Edward A. Pollack
President of Penna. State Mayors'

The Honorable John Nipaver
Mayor of Speers
Rep. of the Southwestern Penna.
Regional Planning Commission

Tri-County Borough Association

MEMBER BOROUGHS
Allenport
Bentleyville
Belle Vernon
Beallsville
Brownsville
Burgettstown
Charleroi
Canonsburg
Centerville
California
Coal Center
Cokeburg
Dawson
Donora
Dunnston
Dunlevy
Ellsworth
Elco
Finleyville
Fayette City
Houston
Long Branch
McDonald
Marianna
Midway
Newell
New Eagle
North Charleroi
Perrytopolis
Rices Landing
Roscoe
Speers
Stockdale
Twilight
West Brownsville

TO: United States Army Corps of Engineers
on Lock and Dams 7 and 8 Feasibility Study

PRESENTED BY: Tri-County Borough Association

Dear Sirs:

The Tri-County Borough Association's primary objective is to encourage the betterment of the Commonwealth of Pennsylvania both environmentally, and economically for its citizens. As such the Association wishes to submit their position on the referred to feasibility study.

Because the Monongahela River is a vital link in the transportation system of Southwestern Pennsylvania and because it provides numerous jobs in this area we, as members of the Association, encourage the Corps of Engineers to promote Alternative No. 3, which calls for the replacements of Locks and Dams 7 and 8 with a new system of Locks and Dams at a proposed cost of $157,630,000.00. It is the Associations position that if this Alternative is Accomplished, it will be sure the economic development of Southwestern Pennsylvania and assure the stability of the current economy of our area.

In addition to what has already been stated the Tri-County Borough Association feels that with the installation of larger lock and dam facilities these systems will more adequately address the larger tows that are currently being used on the river and which are currently handicapped by the antiquated facilities currently located at sites 7 and 8. In addition Alternate No. 3, would result in the least negative impact and would result in the least disruption for the residents in this particular area.

MEMBER BOROUGHS
Allenport
Bentleyville
Belle Vernon
Beallsville
Brownsville
Burgettstown
Charleroi
Canonsburg
Centerville
California
Coal Center
Cokeburg
Daveana
Donora
Dunston
Dunlevy
Ellsworth
Elco
Finleyville
Fayette City
Houston
Long Branch
McDonald
Marianna
Midway
Newell
New Eagle
North Charleroi
Perryopolis
Rices Landing
Roscoe
Speers
Stockdale
Twilight
West Brownsville

In conclusion, the Tri-County Borough Association, encourages the Army Corps of Engineers to begin taking steps to achieve this end as soon as possible so the economy of Southwestern Pennsylvania, and the surrounding areas may begin to realize the benefits of a new and larger lock and day system on the Monongahela River.

Borough Officials
Representing
Thirty-five
Municipalities of
Washington, Greene,
and Fayette Counties

Velma J. Rollison
President
Dunlevy Borough Council,
Secretary-Treasurer
Tri-County Borough
Association

DAVID MILLER, CHAIRMAN
CHARLES MURRAY
S. L. ADAMSON
W. ERNEST WATSON
WILLIAM PORTER
JOAN JESSEN
A. S. KENNEY
JOHN HEPLER
WILLIAM FINLEY

WASHINGTON COUNTY PLANNING COMMISSION

EXECUTIVE DIRECTOR: WILLIAM P. DENNIS
COURTHOUSE SQUARE 100 WEST BEAU STREET WASHINGTON, PENNSYLVANIA 15301
(412) 228-6811
(412) 343-9660

COUNTY COMMISSIONERS:
FRANK A. MASCARA
DAVID L. GILMORE
EDWARD M. PALUSO

November 18, 1983

Major T. L. Ricer
Department of the Army
Pittsburgh District, Corps of Engineers
William S. Moorhead
Federal Building
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Dear Major Ricer:

Thank you for the opportunity to review the Locks and Dams 7 and 8 Draft Feasibility Study completed in August of 1983.

A modern and efficient Monongahela River navigation system is indispensable to the economic vitality of Washington County and the region.

Our office concurs with the study that improvements to Locks and Dams 7 and 8 are very necessary and will help improve the Monongahela River navigation system.

We look forward to the completion of the Final Feasibility Study report due early in 1984 and the recommended actions that will be sent to Congress.

Sincerely,

Floyd A. Laubham

Floyd A. Laubham
Planner II

FAL/jac

MONONGALIA COUNTY COMMISSION

COURT HOUSE
MORGANTOWN, WEST VIRGINIA 26505

Eugene J. Sellaro, President
Joseph E. Kun, Commissioner
James A. Ashburn, Commissioner

Telephone: 304 291-7287

October 18, 1983

LTC John L. Richards
District Engineer
U. S. Army Corps of Engineers
Wm. S. Morehead Federal Building
Pittsburgh, Pennsylvania 15222

Dear LTC Richards:

It has recently been brought to our attention that a decision will be made in the near future as to repair or replacement of Locks and Dams No. 7 and 8 at Grays Landing, Point Marion, Pennsylvania.

Upon reviewing documents which were forwarded to us, we believe Alternative No. 3 - Replacement with Larger Locks, would be the most advantageous solution to future economic problems in the Monongalia County area.

Replacement rather than repair would involve only a minimal amount of interference for waterway traffic during construction; modern, safe and efficient structures with adequately sized lock chambers would be provided; and, replacement would allow potential industrial growth to occur.

We are hopeful our support of new lock facilities will be considered in evaluating the future of Locks and Dams No. 7 and 8.

For the Commission,

Eugene J. Sellaro
President
Monongalia County Commission

Wheeling Area Chamber of Commerce
1012 Main Street Wheeling, W. Va. 26003 304-233-2575

November 9, 1983

United States Army Corps of Engineers
Regulatory Branch
Room 1834
1000 Liberty Avenue
Pittsburgh, Pennsylvania 15222

Gentlemen:

The Wheeling Area Chamber of Commerce supports Alternative 3 which would replace locks and dams 7 and 8 with chambers that are compatible with the other modern locks on the river.

We are in agreement with the Waterways Association of Pittsburgh in claiming the need for new facilities thereby eliminating inefficiency and ever increasing repair costs.

River commerce can ill afford to be faced with a continuing bottleneck caused by antiquated structures.

Sincerely,

P. Phillip Day
Executive Director

PPD/cr

ACCREDITED CHAMBER OF COMMERCE

Farmers' & Merchants' F M Bank

P.O. Box 698 • 466 High St. • Morgantown, West Virginia 26505 • Telephone (304) 292-9441

October 25, 1983

Herb Wise, Project Manager
Planning Division
U. S. Army Corps of Engineers
William S. Moorhead Federal Building
Pittsburgh, PA 15222

Re: Lock and Dam 7
Lock and Dam 8
Monongahela River

Dear Mr. Wise,

We are greatly concerned about the replacement or repair of the above captioned Locks and Dam, since the Bank Trust Department holds significant interest in river property and companies that use the said Locks and Dams for shipping of coal.

After reviewing published proposals covering the matter, we wish to extend our comment in favor of replacement with larger locks, thus allowing for potential industrial growth and minimal waterway traffic interference during construction.

Your attention and support favoring the proposal will be most beneficial to the Morgantown/Fairmont area. Providing us with the opportunity to express our desires is appreciated.

Sincerely,

Delbert R. Baker
Vice President
and Trust Officer

drb;v

62-511 0 - 86 - 9

HARBOVA MINING COMPANY
(304) 329-2600
P. O. BOX 87, KINGWOOD, WEST VIRGINIA 26537
November 1, 1983

Mr. Herb Wise, Project Manager
Planning Division
U.S. Corps of Engineers
William S. Moorhead Federal Bldg.
Pittsburgh, Pa. 15222

Dear Mr. Wise,

Harbova Mining Co. currently employs approximately two hundred people in the Monongahelia and Preston County, W.Va. area. One of the principle functions of Harbova Mining Co. is to assure the smooth and controlled delivery of 500,000 tons of coal annually by contract barge which must pass through the deteriorating locks and Dams 7 and 8.

Harbova Mining Co. wholeheartedly supports alternative Number 3 which would construct a new eighty four foot by seven hundred twenty foot (84' x 720') lock and fixed Crest dam at Gray's Landing (V.M.82.2) and a new eighty four foot by seven hundred twenty foot (84'x 720')lock landward of the existing lock at lock and Dam 8 (V.M.90.8). This would invalue only a mininal amount of interference of smooth barge deliveries also, since we use jumbo barges, the new larger-sized chambers would be able to easily accomodate these barges.

I want to thank you in advance for your time and consideration of this letter. Any other alternatives than Alternative #3 would have a very negative effect on our livelihood.

Sincerely

Daniel C. Crawford
Vice President of Operations

DCC:na

FOUNDED 1913

M AND O MARINE, INC.

MARINE CONTRACTORS

OHIO RIVER AT OHIO STREET - McKEES ROCKS, PA. 15136 - (412) 331-5857

October 26, 1983

Mr. Herb Wise, Project Manager
Planning Division
U.S. Army Corps of Engineers
William S. Moorhead Federal Building
Pittsburgh,PA 15222

Re: Monongahela River Navigation
System - Locks and Dams 7 and 8

Dear Mr. Wise:

Our company is very much interested in the Planned changes in the middle Monongahela River Navigation System at Locks and Dams #7 and #8. We were represented by Mr. Flenniken of our company at the recent Point Marion meeting held by Colonel Richards last Wednesday.

We support Alternative Number 3 which would construct a new 84'X 720' Lock Chamber and a Fixed Crest Dam at Gray's Landing (Mile 82.2) and the construction of a new 84' X 720' Lock landward of the existing lock at Lock and Dam 8.

We feel that Lock and Dam 7 are both too old, too small, and inadequate to continue in operation however the new additional Gated addition to the dam at Lock 8 indicates to us the structure is still worthy of continued use.

We hope your office will receive permission and funding to go ahead with this work as soon as possible.

Very truly yours,

CEF:jk

Morgantown Industrial Park

P.O. Box 1109
Morgantown, West Virginia 26505
Phone 304/292-9453

October 25, 1983

Herb Wise, Project Manager
Planning Division
U. S. Army Corps of Engineers
William S. Moorhead Federal Building
Pittsburgh, PA 15222

Dear Mr. Wise:

The Morgantown Industrial Park, located at Milepost 103.2 on the Monongahela River, advocates the position taken by the U.S. Army Corps of Engineers on Alternative 3 in regards to Lock and Dams 7 and 8. That being construct a new 84' x 720' lock and fixed crest dam at Greys Landing (r.m. 82.2) and a new 84' x 720' lock, landward of the existing lock at Lock and Dam (r.m. 90.8).

The Morgantown Industrial Park, Inc. owns two barge coal loading facilities on the Monongahela River with capacities in excess of 70,000 tons per month. Should the Monongahela River be closed for an extended period of time, it would have a disastrous effect on the local coal industry causing cancelling of sales contracts as well as bankruptcy. It is our hope that the Corps proceeds with Option 3 at the quickest possible speed with the least amount of down time for river transportation.

Alternative 3 is the best solution because Alternative 1 would close the River 10 months and the adequated small size lock would still be used; Alternate 2 would also keep the small size lock when larger is required; keep high cost of coal transportation due to lock size and reduce development possibilities; and, Alternative 4 would deter further growth and keep higher price for additional lockings due to smaller lock size. Two primary points must be made in studying Lock and Dam 7 and 8: (1) Least amount of interference for waterway traffic, and (2) The need to upgrade the Locks to 84' x 720' to reduce locking time and reduce shipping charges.

Morgantown Industrial Park, Inc. supports Alternative 3 of the Corps report and hopes the construction can be completed as quickly as possible.

Sincerely,

John R. Snider

John R. Snider
Executive Vice President

JRS/lds

Ohio River

The Ohio River Company
1400-500 Building
Post Office Box 1400
Cincinnati, Ohio 45201
(513) 721-4000

October 18, 1983

LTC. John L. Richards
District Engineer
U. S. Corps of Engineers
William S. Morehead
Federal Building
Pittsburgh, PA. 15222

Dear Sir:

The Ohio River Company, and its affiliates are currently moving over 1 million tons of coal each year on the Monongahela River. This movement requires the utilization of approximately 1,000 barges per year. The existing Lock and Dams 7 & 8 serve as a severe restriction to the efficient movement of this coal. The end result of this inefficiency is an increase in finished product loss to the consumer. Currently it requires a normal size tow to lock twice at both Lock & Dam 7 & 8. The alternative #3 proposal as detailed in the Public Information Fact Sheet of the Monongahela Navigation System would eliminate the need to lock twice and would increase both the throughput of Lock & Dam 7 & 8 and the productivity of the entire Monongahela River System.

The Ohio River Company would support alternative 3, the construction of a new Lock & Dam 7 & 8 with dimensions of 84' wide and 720' long.

Sincerely,

John J. Faas, Jr.
Port Captain

JJE/nmc

Rosedale Coal Company, Inc.

MRS. ORA LEE J. KIRK
PRESIDENT

540 DUNKARD AVENUE, WESTOVER
MAILING ADDRESS
P.O. BOX 875, MORGANTOWN, W.VA. 26507

TELEPHONE
AC 304 292-4440

November 9, 1983

Herb Wise, Project Manager
U.S. Army Corps of Engineers
Pittsburgh Pa. 15222

Dear Mr. Wise:

I thought you all held a very good open meeting in Pt. Marion.

I wish to advise that we believe the best plan to use if that of building 2 new larger dams, as we believe that will give a minimal interference with waterway traffic during construction.

Very truly yours,

ROSEDALE COAL COMPANY

Ora Lee J. Kirk, President

STANDARD SAND & GRAVEL COMPANY

THIRTY-FOURTH AND MARKET STREETS · PHONE (304) 233-2710

WHEELING, WV 26003

October 25, 1983

Lt. Col. John L. Richards
U.S. Army Corps of Engineers
Pittsburgh District
William S. Moorhead Federal Bldg.
1000 Liberty Avenue
Pittsburgh, PA 15222

RE: Monongahela River
Locks and Dams 7 and 8

Dear Col. Richards:

The deteriorated condition of Locks and Dams 7 and 8 make it imperative that something must be done to protect the upper Monongahela industry and population.

The long lock closure which would be necessary for rehabilitation would have a disastrous effect upon industry, bringing about more unemployment.

Replacement-in-kind is not the answer. The bottleneck that now exists would still be there.

Alternative 3 would give us new locks of sufficient size to handle the navigation traffic efficiently.

Alternative 4 would not relieve the congestion as now exists and would displace too many families.

Alternative 5 would also displace too many families.

I urge adoption of Alternative 3.

Very truly yours,

STANDARD SAND & GRAVEL COMPANY

D. C. Dickson

D. C. Dickson
President

DCD/dc

Darwin F. Johnson
Attorney At Law
P.O. Box 1403, Morgantown, West Virginia 26505

Telephone
304-296-3393

October 21, 1983

Herb Wisc, Project Manager
Planning Division
U.S. Army Corps of Engineers
William S. Moorhead Federal Building
Pittsburgh, PA 15222

Dear Mr. Wise:

In response to your public meeting agenda held on Wednesday, October 19, 1983, we indicated that we would submit a written statement in reference to locks and dams 7 and 8 on the Monongahela River. We are the owners of Vance Coal Company, Inc., which is a river loading facility located at the 98.8 mile marker in Westover, Morgantown, West Virginia. We have been in business since 1960, and last year we were loading 80,000 tons a month over our facilities. We have noticed a trend in recent years that many of the barges we are loading are now stumbo and jumbo barges. The antiquated locks, locks 7 and 8, will not accommodate such large barges and cost us an additional dollar a ton to be competitive on the market to ship through those two locks. Additionally, we brokered coal through our company, Raintree, Inc. In order to competitively bid coal on the river via jumbo barges, it is imperative that we have larger lock chambers at locks 7 and 8.

We strongly favor alternative number 3, which would give us new large, modern locks, and additionally, would not require the river to be shut down for ten months to a year and a half. If the river was, in fact, shut down for a year or longer, it would, in effect, put many of the small companies into total bankruptcy.

In addition to our existing facility, we are building a new river loading dock at the 104.7 mile marker, which is located at the intersection of I-79 and U.S. 48. This dock is known as The Uffington Dock, and has a loading capacity of 100,000 tons per month. We have acquired all of our permits and are in the process of building this facility now. This facility is designed for a washed product of high volume coal coming out of Preston County and Clarksburg and should be considered into your increased capacity computations.

In a good coal market we will load in excess of two million tons over both of our facilities.

We strongly urge that the government select alternative 3, which will give us a low cost and energy efficient transporation system on the Monongahela River.

Thank you kindly.

Respectfully yours,

Darwin F. Johnson

DFJ:nls

October 21, 1983
Rt. 5, Box 310
Morgantown, W.V. 26505

Herb Wise, Project Manager
Planning Division
U.S. Army Corps of Engineers
William S. Moorhead Fed. Bldg.
Pittsburgh, Pa. 15222

Dear Mr. Wise:

With reference to Lock & Dam 7 and Lock & Dam 8, I feel that Alternative #3, replacement with larger locks, would be more feasible than repairing existing locks.

With the coal business as depressed as it is, closing the locks for an extended length of time would nearly bankrupt those coal companies who depend on the river to ship their coal. Many people would be put out of work.

Also, to repair the existing locks will not allow for future growth to occur. Even though it will cost less to rebuild existing dams, it will cost more in the long run as these dams will have to be eventually have to be replaced.

Thank you for your consideration of these comments.

Sincerely,

Mrs. Denny Hall

Mrs. Denny Hall

illip Kirk
ckley on Cheat
. 7, Box 761
rgantown, WV 26505

October 25, 1983

. Herb Wise, Project Manager
anning Division
S. Army Corps of Engineers
lliam S. Moorhead Federal Building
ttsburgh, PA 15222

ar Mr. Wise:

I am writing in support of the Corps' recommended alternative r replacement of Lock and Dam 7 and Lock and Dam 8. I was able attend part of the public meeting held in Point Marion, and it ems to be the most sensible plan in terms of utility and cost ffectiveness. It would be of great benefit to the economy of the tire region, and hence to our country.

However, I am also greatly concerned that the utmost consid- ation be given to the citizens who may be displaced from their mes and businesses in the affected areas. The Greensboro area particular is of the highest historical interest and value, d I feel that all possible steps must be taken to alleviate e potential detrimental effects of the project on this histor- ally significant area. Thank you.

Sincerely,

Phillip Kirk

B. R. Brown
Chairman
and Chief Executive Officer

Consolidation Coal Company
Consol Plaza
Pittsburgh, Pennsylvania 15241
(412) 831-4010

November 21, 1983

LTC John L. Richards
District Engineer, Pittsburgh District
U. S. Army Corps of Engineers
William S. Moorhead Federal Building
1000 Liberty Avenue
Pittsburgh, PA 15222

Dear Colonel Richards:

Enclosed are Consolidation Coal Company's written comments in support of the Pittsburgh District's tentatively selected plan to replace antiquated and inadequate Locks 7 and 8 on the Monongahela River with new larger locks. These comments are an amplification of our oral remarks at the October 19, 1983 public hearing at Point Marion, Pennsylvania.

Sincerely,

BRB:ccm
Enclosures

COMMENTS

OF

CONSOLIDATION COAL COMPANY

ON THE

U.S. CORPS OF ENGINEERS' PROPOSAL

TO

REPLACE AND ENLARGE LOCKS AND DAMS 7 AND 8

B. R. Brown
Chairman and
Chief Executive Officer
Consolidation Coal Company

November 21, 1983

Consolidation Coal Company (Consol) is America's largest coal mining company in terms of annual revenues and reserves. The company produces approximately 50 million tons of coal a year at its 45 underground and surface mines located in nine states and Alberta Province, Canada, and New South Wales, Australia. The 119-year-old company controls 12.2 billion tons of recoverable coal reserves. A fully-integrated company, Consol has the capability to mine, process, transport and market a wide range of coals. Consol is a worldwide marketer of high quality steam and metallurgical grade coals. The company's coal is sold to customers in 29 states and in 17 foreign countries.

Consol also operates Twin Rivers Towing, one of the largest towing companies operating on the Monongahela River. Twin Rivers employs 120 people, operates six tow boats and annually transports 10 million tons of coal produced by Consol and others. The coal is delivered to facilities in Ohio, Pennyslvania, West Virginia and, in an intermodal route, to Canada.

Consol fully supports the United States Corps of Engineers' proposed recommendation to replace decrepit Locks and Dams 7 and 8 with new larger locks. As we testified at the October 19, 1983 public hearing at Point Marion, Pennsylvania, Consol concurs with the Corps that the best alternative is to construct a new 84'x720' lock and fixed crest dam at Grays Landing and a new 84'x720' lock landward of the existing lock at Lock and Dam 8.

Importance of Locks 7 and 8 to Consol

The entire production from four large Consol mines which employ 1800 people in West Virginia is transported solely by barge on the Monongahela River. The four mines -- Arkwright, Osage, Humphrey and Pursglove -- constitute Consol's Morgantown Operations. (See attached map.) Projected sales from Consol's Morgantown Operations during the latter part of the 1980s are at least 6,400,000 tons per year with a possibility that shipments will exceed 7,000,000 tons annually. The lower projected sales level is equivalent to a daily average production of 26,400 tons. All coal shipped from these mines is loaded into river barges at the Arkwright and Humphrey preparation plants. No rail loading facilities exist at either plant.

Currently, coal shipped from these Morgantown operations is transported by barge on a regular basis to three power plants (Fort Martin, Hatfield Ferry, and Mitchell) owned and operated by the Allegheny Power System and located along the Monongahela River. Coal is also barged to the Union Railroad's Duquesne Wharf which is located near Lock and Dam 2 on the Monongahela River. At Duquesne Wharf, the coal is transferred to railroad cars, then hauled by the Bessemer and Lake Erie Railroad to Ontario Hydro's Lake Erie storage facility at Conneaut, Ohio. Periodically, barge deliveries are made to Allegheny Power Company's Pleasants power plant on the Ohio River near Parkersburg, West Virginia. Additional barge shipments to other customers will begin within the next two years.

Approximately 5.2 million tons, 84 percent of Consol's current shipments from mines in Morgantown Operations, must pass through both Locks 7 and 8 on the Monongahela River. The balance is shipped from Arkwright and

Humphrey to the Fort Martin station which is upriver from Lock 8. Any disruption to river traffic caused by closing either or both locks, therefore, would immediately and directly affect coal shipments from Consol's mines by at least 21,500 tons per day. However, the impacted tonnage could exceed seven million tons which is nearly 30,000 tons per day.

Inadequacies of Locks 7 and 8

The age, limited size and deteriorating conditions of Locks 7 and 8 are serious constraints to the safe and efficient use of the Monongahela River. Without replacement or rehabilitation, these locks will probably have to be permanently closed before the end of the century. These antiquated and inadequate locks are already causing delays of ever increasing duration. Coal producers, shippers and consumers bear the brunt of these delays and increased costs because coal is the largest single commodity moving on the Monongahela. Moreover, much of the projected traffic growth, both here and in other segments of the inland waterway system, will be in coal.

The delays and inefficiencies we are currently encountering at Locks 7 and 8 would be eliminated by replacing these facilities with locks twice their current size. Locks 7 and 8 are the smallest on the river. They create quite a bottleneck because tows which easily pass through larger, adjacent locks must be broken in two to pass through Locks 7 and 8. Doubling the current locking capacity will significantly reduce the time necessary to transit Locks 7 and 8 and will, therefore, help hold down the overall cost of the commodities being shipped. By enabling shippers to freely move the same size tows up and down the length of the Monongahela, expanding the size of Locks 7 and 8 will help commodities compete more successfully in the marketplace and enhance the economic vitality of the area.

Conversely, if Locks 7 and 8 must be shut down due either to a lack of action or because of rehabilitation efforts, the costs to the river valley area will be enormous. The Corps has identified many of the economic penalties that would be involved. As pointed out in Appendix H (pg. H-8), however, additional or secondary impacts would significantly raise the costs of lock closures. Consol's recently concluded investigation into a number of these additional costs buttresses the Corps' conclusion that rehabilitation is not the best answer to the problem.

Potential Shutdown of Consol's Morgantown Operations

Coal production could come to a complete halt at Consol's four coal mines in the Morgantown area if either Lock 7 or 8 are closed for an extended period. Shipments to the Mitchell and Hatfield Ferry power stations would cease, and even Fort Martin could be forced to shut down during a prolonged closure, such as for ten months to one year.

Approximately one-half of Fort Martin's coal burn is low-sulfur, compliance coal produced in eastern Kentucky to comply with West Virginia sulfur dioxide emission regulations. This coal is barged up the Ohio and

Monongahela Rivers. Before reaching the power plant, however, it must pass through Locks 7 and 8. If these locks are closed for a continuous period of one year during a major rehabilitation project, Fort Martin would be unable to take deliveries of this low-sulfur coal because the plant does not have facilities for unloading railroad cars nor is low-sulfur coal available from sources above Lock 8. Without low-sulfur coal, Fort Martin would be "out of compliance" and could be forced to cease operations until low-sulfur coal is available again after the locks reopen to river navigation. The power plant could not meet air quality standards and continue to operate using barge-delivered higher sulfur coal from Consol's or other mines located upstream from Lock 8.

Other conditions related to the locks being unavailable could also force Consol to completely shut down mining operations in the Morgantown area if Fort Martin is unable to take coal deliveries. Should larger barges sink at Fort Martin, salvage equipment, normally kept downstream from Lock 7, would not be available to raise sunken barges if the locks are closed during a major rehabilitation. In the event the tow boat, Kimberly, which moves barges between Consol's mines and Fort Martin, would snap a shaft or need major repairs -- the floating dry dock needed to take the boat out of water so that repairs can be made could not be towed to where it was needed because the dry dock, normally, is kept below Lock 7 at Consol's marineways in Elizabeth, Pennsylvania.

Any of these or other problems might arise, and Consol would find it extremely difficult to find alternate customers for the large volume of coal that would be affected by the closure of Locks 7 and 8. With either lock closed for a prolonged period during rehabilitation, coal production in Consol's Morgantown operations, as much as 7 million tons per year, would cease.

Potential Economic Impact Associated With a Prolonged Lock Closure

Eighteen hundred jobs in Consol's mining operations alone would be jeopardized during a prolonged rehabilitation period. These potential job losses can be translated into lost wages estimated to be at least $60 million per year, or more than one million dollars per week. In addition, other losses would occur within the mining communities and throughout the tri-state area of West Virginia, Pennsylvania and Ohio. Moreover, the total effect upon a community resulting from either an increase or decrease in wages paid directly to workers in a basic industry, such as coal mining, is compounded by a factor of at least two. Even with this conservative estimate of the "multiplier effect," lost wages amounting to $60 million could have an adverse economic impact of $120 million upon the communities affected.

As a consequence of lost production and a corresponding reduction in hours worked by Consol's employees due to closure of Locks 7 and 8, the U.M.W.A. Health and Retirement Funds would lose nearly $15 million a year.

The state of West Virginia would lose $7 million to $10 million in tax revenues and the state's unemployment compensation expenses would increase by about $15 million.

If the locks are closed for a ten to twelve month period, and no alternative method is available to ship coal, the four coal mines in the Monongahela area would have to be maintained on a standby status assuming that their previous markets would still be available to them after the locks reopened. The cost of maintaining these Morgantown operations in an idle status for one year during lock repairs would be $55 million. This represents the cost of keeping four large coal mines in a nonoperating, but safe condition. The $55 million out-of-pocket idle mine cost does not include any allowance for lost profits.

If Consol had to close its Morgantown Operations for one year because barge deliveries could not continue to existing customers, the potential revenue loss would amount to $225 million. The total revenue loss would be at least $260 million if Consol is unable to make barge deliveries to new customers with whom it has contracts and to the Fort Martin station.

Rerouting Coal Shipments To Bypass Locks 7 and 8

In view of the enormous losses associated with closing its Morgantown operations caused by the disruption of river navigation during rehabilitation of Locks 7 and 8, Consol has investigated six alternative routes for shipping coal that would bypass Locks 7 and 8, including highway and rail transport. The infrastructure that could handle as much as seven million tons of diverted coal traffic does not presently exist. That infrastructure and auxiliary coal-handling equipment would have to be built.

Based upon Consol's preliminary studies, as much as $10 million in capital expenditure would be required to construct the necessary facilities for transporting and handling rerouted coal shipments. This would include such items as building rail and truck loading facilities at the coal mines and a rail-to-barge coal transfer dock below Lock 7, coal haulage roads, and purchases of coal transportation equipment. The $10 million estimate is probably conservative because it does not include any land acquisition costs for a new rail-to-barge coal dock below Lock 7. These upfront capital expenditures will result in abnormally high unit costs per ton of coal handled because the facilities would be used only during the rehabilitation period. Based upon current costs of capital and a one-year write-off, amortized investment costs would add at least $2.00 per ton to delivered costs, excluding land and operating costs.

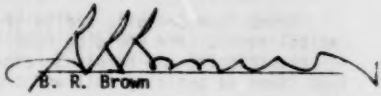
In addition to upfront capital, other costs need to be considered such as the incremental cost over present barge haulage, which would include overland freight to a site below the locks and coal transfer to river barges could add $5.00 per ton to present delivered coal prices.

These preliminary findings, based on Consol's study of alternative routes, would add $35 million to $50 million to customers' annual fuel costs during the period when Locks 7 and 8 are closed for major rehabilitation and electricity rates would therefore be substantially increased.

Conclusion

The Monongahela River serves the industrial sector and, in turn, the public by providing low cost and energy efficient transportation. The industrial commodities and fuels carried by water, including coal in major and rapidly rising tonnages, enter into the production of products used by all Americans -- kilowatt hours of electricity, iron and steel products, chemicals, and construction materials, among other products. Beneficiaries of the inland navigation system are dispersed not only along the river but nationwide. Expansion of Locks 7 and 8 will help assure abundant energy supplies. It will also help producing industries moderate the final cost of innumerable products which are distributed to consumers in other areas of the country. For example, electricity generated in the Ohio River Basin from coal delivered by barge is routinely sold to utilities in the northeast and Atlantic coast states.

Consol believes that a viable, safe and efficient inland navigation system is essential to expand domestic energy supplies and the industrialization necessary for economic recovery. Consequently, Consol strongly supports the replacement of outmoded and inadequate lock and dam facilities which cause costly transportation delays and inhibit economic development. For these reasons, we believe that the Corps has correctly chosen to recommend the replacement of Locks 7 and 8 with new larger lock chambers.



B. R. Brown

PENNSYLVANIA
OHIO
OHIO
PENNSYLVANIA
WEST VIRGINIA
WEST VIRGINIA
CONSOLIDATION COAL COMPANY
PITTSBURGH, PENNSYLVANIA
PLANTS AND MINES
SERVED BY THE RIVER DIVISION
LEGEND
LOCKS AND DAMS
CITIES
POWER STATIONS
SCALE IN MILES
NOVEMBER 22, 1952

COUNTY OF FAYETTE
OFFICE OF THE COUNTY COMMISSIONERS

COURT HOUSE
UNIONTOWN, PENNSYLVANIA 15401
PHONE (412) 437-4889

BOARD OF COMMISSIONERS
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MARION C. KLINGENSMITH

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POINT MARION
SMITHFIELD
SOUTH CONNELLSVILLE
VANDERBILT

TOWNSHIPS
BROWNSVILLE
BULLSKIN
CONNELLSVILLE
DUNBAR
FRANKLIN
GEORGES
GERMAN
HENRY CLAY
JEFFERSON
LOWER TYRONE
LUZERNE
MENALLEN
NICHOLSON
NORTH UNION
PERRY
REDSTONE
SALTLICK
SOUTH UNION
SPRINGHILL
SPRINGFIELD
STEWART
UPPER TYRONE
WASHINGTON
WHARTON

SCHOOL DISTRICTS
ALBERT GALLATIN AREA
BROWNSVILLE AREA
CONNELLSVILLE AREA
FRAZIER
LAUREL HIGHLANDS
UNIONTOWN AREA
PARTS OF
SOUTHMORELAND
BELLE VERNON AREA

November 15, 1983

Major T.L. Ricel
U.S. Army Corp of Engineers
Federal Office Building
1000 Liberty Avenue
Pittsburgh, PA 15222

Dear Sir:

I am enclosing herewith for your information and consideration, a copy of a Resolution adopted by the Fayette County Board of Commissioners on October 27, 1983, in support of the comtemplated change of Locks 7 and 8, on the Monongahela River as proposed by the U.S. Army Corp of Engineers.

Very truly yours,

FAYETTE COUNTY BOARD OF COMMISSIONERS

Joseph P. Korona, Jr.
Chief Clerk

JPK/pp

RESOLUTION OF THE
FAYETTE COUNTY
BOARD OF COMMISSIONERS

WHEREAS, the Monongahela River in Pennsylvania and in adjoining States is a major carrier of bulk products, and

WHEREAS, Locks 7 and 8 along the Monongahela River, near the communities of Point Marion and Grays Landing, in Fayette County, Pennsylvania, are in need of repair and widening, and

WHEREAS, the U.S. Army Corps of Engineers is desirous of making such repairs, and

WHEREAS, such repairs are in the best interests of transportation generally and of Fayette County in particular.

NOW, THEREFORE, the Fayette County Board of Commissioners hereby resolves to support the contemplaced changes of Locks 7 and 8, as proposed by the U.S. Army Corps of Engineers.

SIGNED at Uniontown, Pennsylvania, this 27th day of October, 1983.

FAYETTE COUNTY BOARD OF COMMISSIONERS

Fred L. Lebder, Chairman

Carmine V. Molinaro, Jr.

Marion C. Klingensmith

ATTEST:

Joseph P. Korona, Jr.
Chief Clerk

The City of Morgantown

389 SPRUCE STREET
MORGANTOWN, WEST VIRGINIA 26505
(304) 291-7405

OFFICE OF CITY MANAGER

November 21, 1983

Mr. John L. Richards, Ltc.
US Army Corps of Engineers
William S. Moorehead Federal Building
Pittsburgh, Pennsylvania 15222

Dear Ltc. Richards:

Enclosed is a resolution recently adopted unanimously by the Morgantown City Council in support of replacement of existing Locks and Dams 7 & 8 of the Monongahela River Navigation System with larger locks. This resolution was adopted as an expression of concern by the Council for the upgrading of the lock system on the Monongahela River. As you know, the commercial traffic capabilities of the Monongahela River is critical to the Morgantown/ Monongalia County area economy.

Please feel free to circulate this resolution. If you have any questions, please do not hesitate to contact me.

Sincerely,

Doug Fawcett

Doug Fawcett
City Manager

DF/dkg

Enclosure

The City of Morgantown

389 SPRUCE STREET
MORGANTOWN, WEST VIRGINIA 26505
304-291-7433

OFFICE OF MAYOR

A RESOLUTION OF THE COMMON COUNCIL OF THE CITY OF MORGANTOWN SUPPORTING THE REPLACEMENT OF LOCKS AND DAMS 7 AND 8 OF THE MONONGAHELA RIVER NAVIGATION SYSTEM WITH LARGER FACILITIES.

WHEREAS, the continued and improved navigability of the Monongahela River is critical to the ability of various industries in Morgantown/Monongalia County to compete in national and international markets; and

WHEREAS, the United States Army Corps of Engineers has recently undertaken a study of the alternatives available for the rehabilitation or replacement of the Locks and Dams 7 and 8 portion of the Monongahela River Navigation System; and

WHEREAS, the replacement of the existing Locks and Dams 7 and 8 with larger locks (Alternative #3 in the Public Information Fact Sheet, September, 1983) would involve minimal interference with river traffic during construction and would provide significantly larger and upgraded facilities;

NOW THEREFORE BE IT RESOLVED, that the Common Council of the City of Morgantown supports and encourages the adoption of the plan to replace Locks and Dams 7 and 8 with larger facilities and urges the United States Congress to appropriate sufficient funding to permit this project to proceed in a timely manner.

Adopted this 1st day of November, 1983.

Frank Petryszak

Frank Petryszak, Deputy Mayor

ATTEST: Patricia J. Campbell

Patricia J. Campbell
City Clerk

December 7, 1983

Lt. Col. John L. Richards
Corps of Engineers
William S. Moorhead Bldg
1000 Liberty Avenue
Pittsburgh, Pa. 15222

Dear Col. Richards:

We the undersigned residents of Greensboro and Glassworks, Pa. have reviewed the Locks and Dams 7 and 8 Feasibility Study Draft. We have the following concerns and comments about the plan to replace the existing Lock 7 with a fixed crest dam at Gray's Landing.

1. We take issue with the Summary of the Feasibility Draft which states "at the present time there are no known areas of controversy ... There are no unresolved issues associated with this project". On the contrary, we are very concerned about the proposed 15 foot rise in the pool and the increased probability of damaging floods in our communities. The affected property owners were not contacted by those preparing the environmental impact is also a cause for concern.

2. Why is the 15 foot rise in the river necessary? Why can't the channel be deepened to offset the potential for damaging floods? Why not build a gated dam instead of a fixed crest dam? How much more would the cost of a gated dam be than the damage to our propertities over the 50 year life span of the dam? Would the higher cost not be justified in terms of minimizing flood damage and the worry and inconvenience of sleepless rainy nights the people of the affected areas will be forced to experience over the life time of the dam? Don't we, the taxpayers and property owners, who will be flooded have a right to help decide this issue?

3. We lack confidence in the statistical projections of flood frequency and damage estimates of the feasibility study. These figures are not in line with our own flood experiences. We believe that more direct study of our communities is indicated before the impact of the 15 foot rise in the river pool can be assessed.

4. The environmental impact statement has not described in sufficient detail the effect of the 15 foot rise in the pool on our community facilities and low lying properties. It is even more lacking in detail concerning the protective measures that can reasonably be undertaken to safe guard our vital community services.

5. We are very uneasy about the proposed easements the government will seek from owners of properties that will be flooded periodically. What factors will the payment formula consist of? Will the affected property owners participate in deciding these factors? Why will the government not want to purchase homes and other property that is likely to be flooded? Surely our flood insurance and other liabilities will increase and our chances of selling our properties to other interested parties will diminish. Will these problems be considered in establishing the cost of the easements?

6. The feasibility study doesn't mention our Greensboro landing, which for many years served as the southernmost navigable port on the river and as an important commercial center. It was the center of Greensboro's social and economic life for approximately 150 years. Today it is the only place in our community where small boats can enter the river. It is still a popular place for fishing and strolling and picnics and parties. Surely it and the people who use it deserve more attention than to let it quietly be inundated.

7. There are inhabited places in Greensboro and Glassworks where already eroded banks will be washed away by repeated flooding. What will be done to protect these banks and the properties and people they support?

8. We are particularly concerned about the possibility of backed up sewers and flooded basements. What assurances can be given that plans will be developed in conjunction with local officials and the public utilities to assure that disruptions and deterioration of vital services will not occur?

Since our communities are small and poor, special measures are needed to assure sufficient funds to support the development of sewers at the proper time. We question whether sufficient funds have been budgeted for this and the other concerns outlined above.

Finally in view of the above concerns we should like to conclude by recommending that a special community environmental impact statement be developed (as an adendum to the present EIS) representative of local governments and affected property owners. This community impact statement should address demographic and socio-economic factors in addition to the impact of the 15 foot rise in the river level on community facilities. It should discuss sewers, water supply, roads, riverbanks, river landing and fishing grounds. It should identify all properties subject to flooding. It should contain a plan that deals constructively with the areas of impact. This plan should be formulated in conjunction with the affected communities because it involves a dovetailing of responsibilities. It should also contain a realistic budget adequate to deal with the areas of impact.

We thank you and your staff for your assistance and for this opportunity to have our views and concerns included in the hearing record.

Sincerely yours,

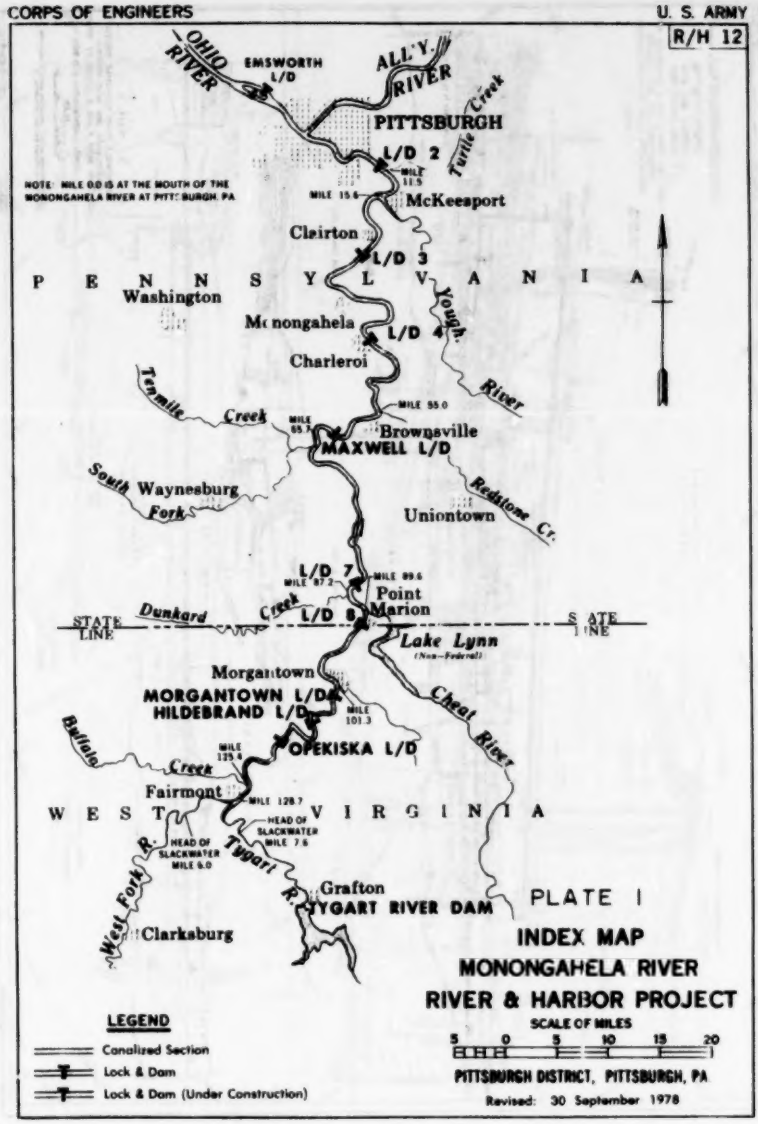
Mr. + Mrs. Joel Clinkscales
Mrs. Helen Ennett
Mike Krupinsky
John Krupinsky
Marian Gregan
Adam Mock
Joe Zabar
Mary L. Mahar
Pearl Kayla
George Kunch
Roy M. Bagwell
Geraldine Meese
Jerry McMains
Andy Bodi
Kennett Mock

Shirley Ruth Vernon
Jessie E. Randell
Charles W. Ford & Ruth Ford
Rev. & Mrs. Winfield S. Harding
Edith Wamsley
Ernest McEntire
Ralph & Delores Brown
Mike & Dorothy Sholar
Geraldine Cooper
Bessie Mae Barge Hardy
Rebecca Ann Barge Hardy
Joe & Linda Kain
Howard Meese

(over)

Keith R. Drew

Allie Jenkins
Bertha Fisher
James Butterworth
John Hardy
James Forma
Louise Popernack
Denny McIntosh
D. J. Kramer
Charles M Maletic
Dale Maletic
Andy Billetz


CORPS OF ENGINEERS
U. S. ARMY
R/H 12
OHIO RIVER
EMSWORTH L/D
ALLEGHENY RIVER
Turtle Creek
PITTSBURGH
L/D 2
MILE 11.5
NOTE: MILE 0.0 IS AT THE MOUTH OF THE MONONGAHELA RIVER AT PITTSBURGH, PA.
MILE 15.6
McKeesport
Clairton
L/D 3
P E N N S Y L V A N I A
Washington
Monongahela
L/D 4
Youghiogheny River
Charleroi
Ten Mile Creek
MILE 55.0
MILE 55.7
Brownsville
MAXWELL L/D
South Fork
Waynesburg
Redstone Cr.
Uniontown
L/D 7
MILE 87.2
MILE 89.6
Point Marion
Dunkard Creek
L/D 8
STATE LINE
STATE LINE
Lake Lynn
(Non-Federal)
Morgantown
MORGANTOWN L/D
HILDEBRAND L/D
MILE 101.3
Cheat River
Buffalo Creek
MILE 129.4
OPEKISKA L/D
Fairmont
MILE 128.7
W E S T V I R G I N I A
HEAD OF SLACKWATER MILE 7.6
HEAD OF SLACKWATER MILE 9.0
Tygart R.
West Fork R.
Grafton
TYGART RIVER DAM
Clarksburg
PLATE I
INDEX MAP
MONONGAHELA RIVER
RIVER & HARBOR PROJECT
SCALE OF MILES
5 0 5 10 15 20
PITTSBURGH DISTRICT, PITTSBURGH, PA
Revised: 30 September 1978
LEGEND
Canalized Section
Lock & Dam
Lock & Dam (Under Construction)

CORPS OF ENGINEERS

U. S. ARMY

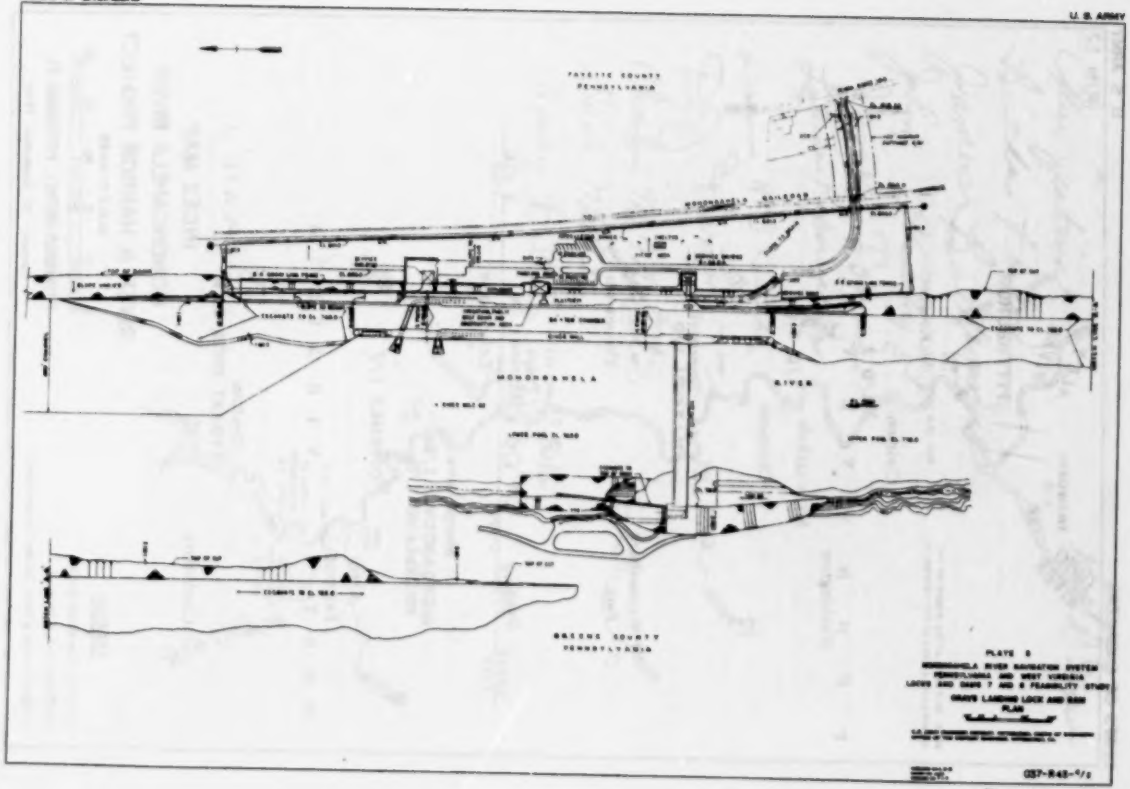


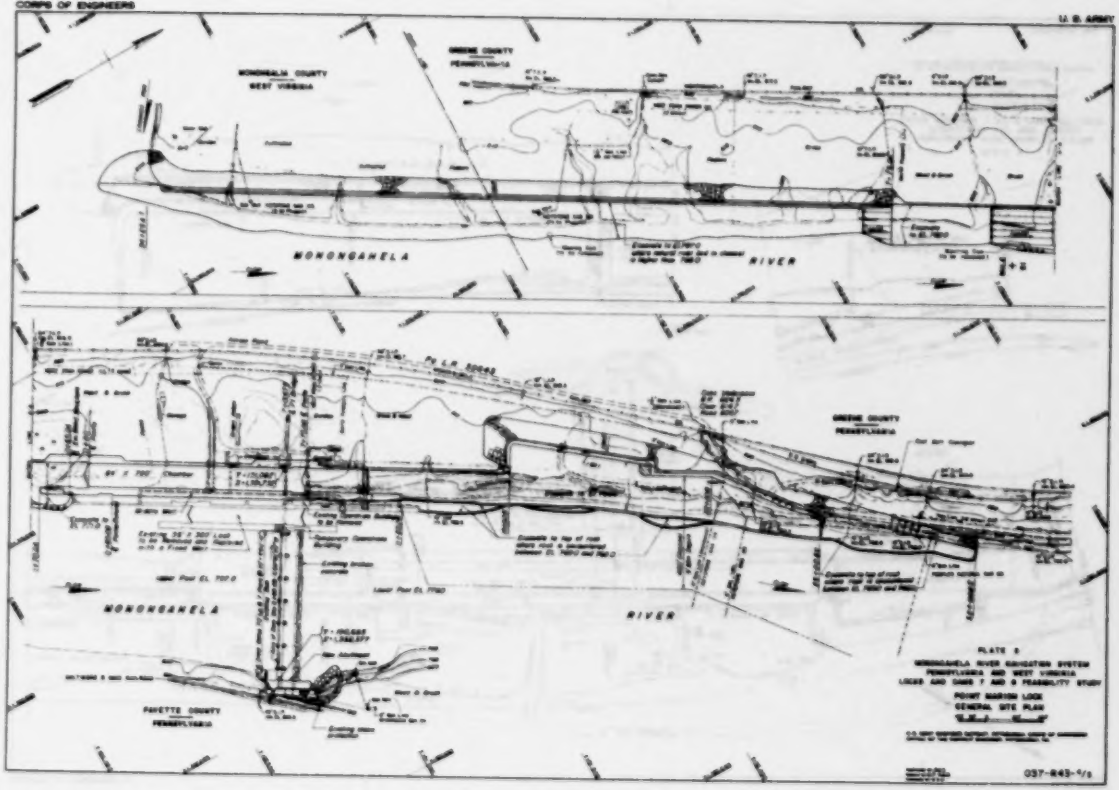
PLATE 8

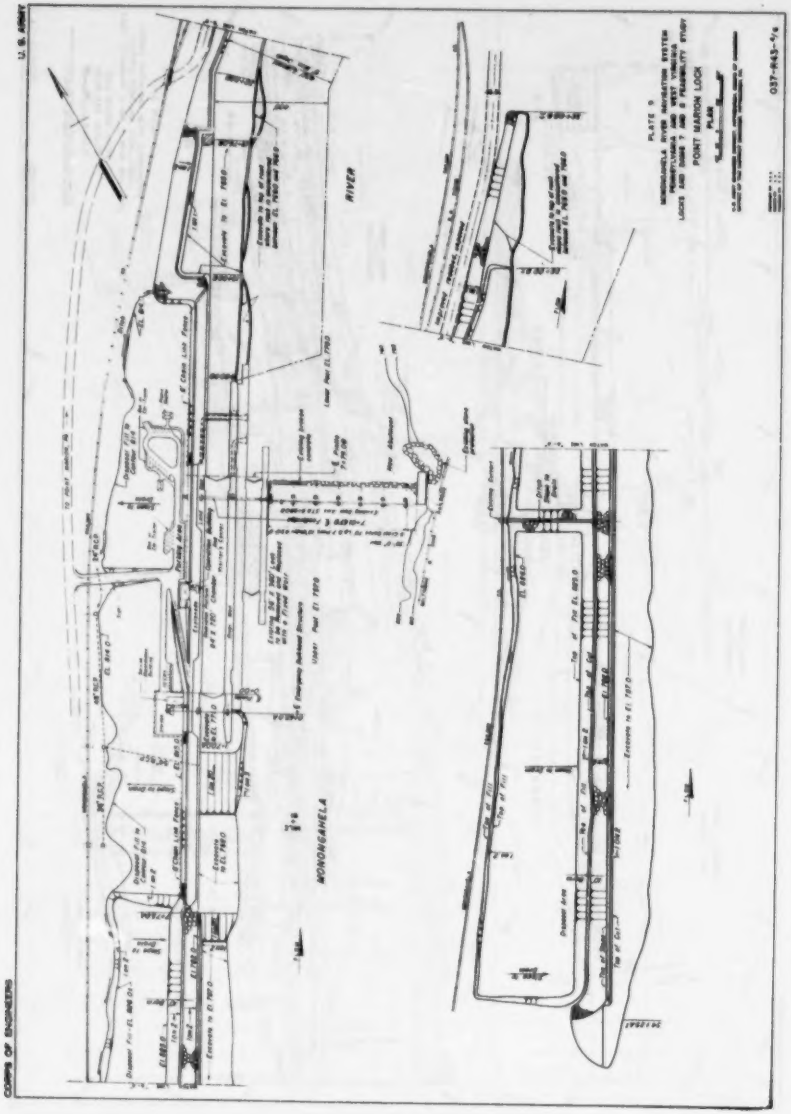
MONONGAHELA RIVER NAVIGATION SYSTEM
PENNSYLVANIA AND WEST VIRGINIA
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY

GRAYS LANDING LOCK AND DAM
PLAN

037-R48-4/8

APR 20 1984 R


CORPS OF ENGINEERS
U. S. ARMY
MONONGALIA COUNTY
WEST VIRGINIA
GREENE COUNTY
PENNSYLVANIA
MONONGAHELA
RIVER
FAYETTE COUNTY
PENNSYLVANIA
PLATE 2
MONONGAHELA RIVER NAVIGATION SYSTEM
PENNSYLVANIA AND WEST VIRGINIA
LOCKS AND DAMS 7 AND 8 FEASIBILITY STUDY
POINT MARION LOCK
GENERAL SITE PLAN
037-843-1/2


U.S. ARMY
CORPS OF ENGINEERS
RIVER
MONONGAHELA
PLATE 9
MONONGAHELA RIVER NAVIGATION SYSTEM
LOCKS AND DAMS 3 AND 4 MODIFICATIONS
LOCKS REPLACEMENT AND WEST WICKETS
POINT MARION LOCK
PLAN
037-N45-Y4